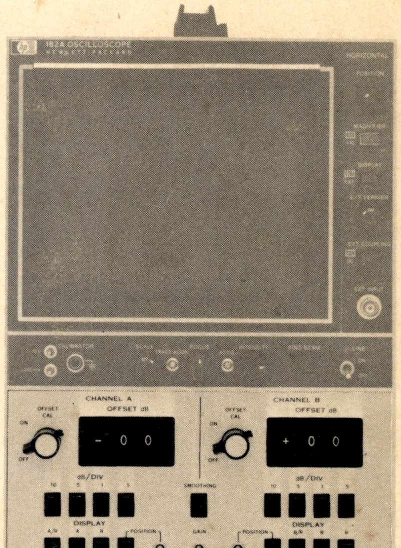
HP 8755A

OPERATING AND SERVICE MANUAL

SWEPT AMPLITUDE ANALYZER

8755A



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HP 8755A

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SWEPT AMPLITUDE ANALYZER
8755A

SERIAL NUMBERS

This manual applies directly to instruments with serial numbers prefixed 1209A.

For additional important information concerning serial numbers, see INSTRUMENTS COVERED BY MANUAL in Section I.

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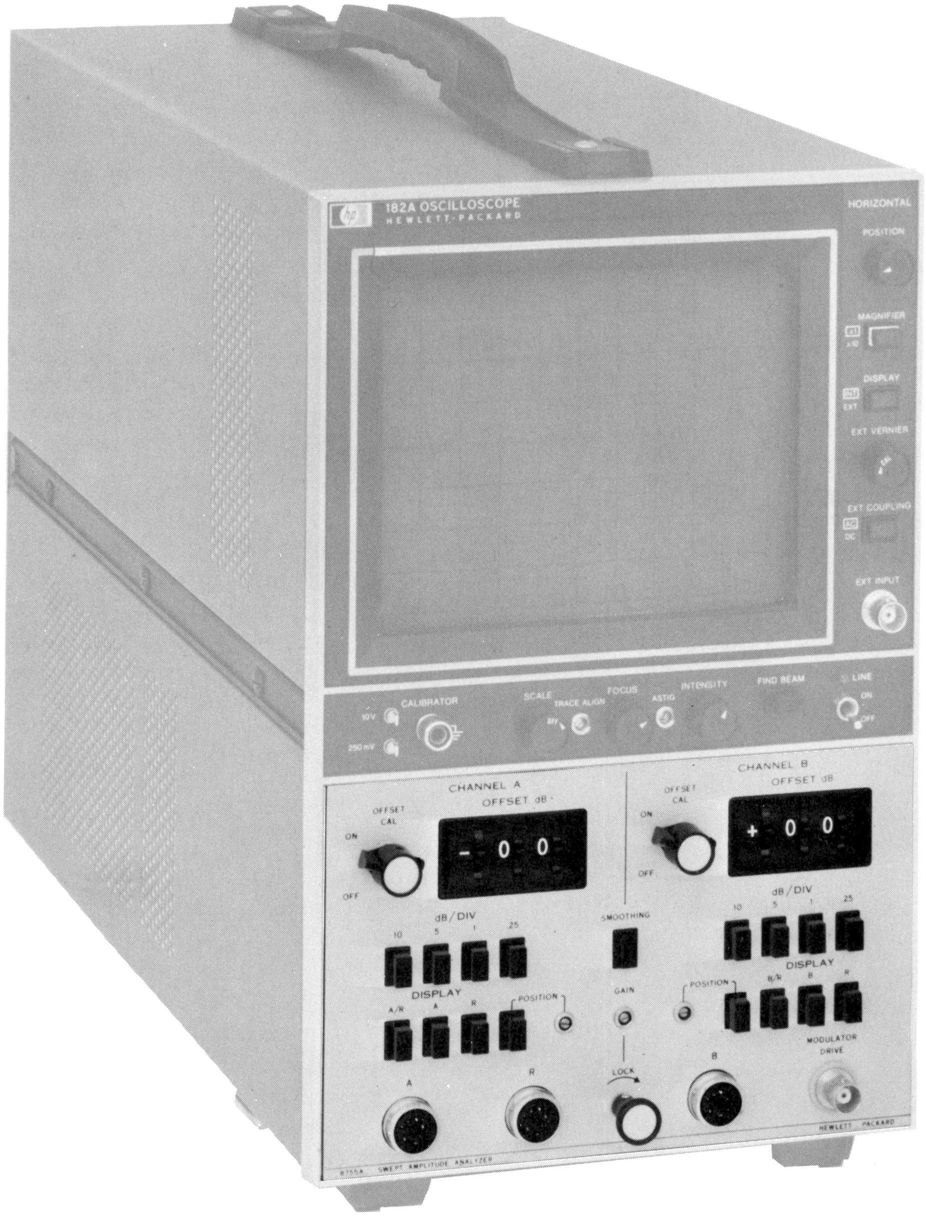

182A OSCILLOSCOPE
HEWLETT-PACKARD
HORIZONTAL
POSITION
MAGNIFIER
DISPLAY
EXT VERNIER
EXT COUPLING
EXT INPUT
CALIBRATOR
SCALE
TRACE ALIGN
FOCUS
ASTIG
INTENSITY
FIND BEAM
LINE
ON
OFF
CHANNEL A
OFFSET dB
CHANNEL B
OFFSET CAL
dB/DIV
DISPLAY
SMOOTHING
GAIN
POSITION
LOCK
MODULATOR DRIVE
A
R
B
8755A SWEPT AMPLITUDE ANALYZER

Figure 1-1. Model 8755A Swept Amplitude Analyzer

SECTION I
GENERAL INFORMATION

1-1. INTRODUCTION

1-2. This operating and service manual applies to HP Model 8755A Swept Amplitude Analyzer and contains information necessary to install, operate, test, adjust, and service it.

1-3. Packaged with this manual is an Operating Information Supplement. This is simply a copy of the first three sections of this manual. This supplement should stay with the instrument for use by the instrument operator. Also included with the manual is an overall schematic diagram. Additional copies of both the Operating Information Supplement and the Overall Schematic Diagram may be ordered separately through your nearest Hewlett-Packard Office. The part numbers are listed on the title page of the manual and on each publication.

1-4. On the front cover of this manual, below the manual part number is a "Microfiche" part number. This number may be used to order 4X6-inch microfilm transparencies of the manual. Each 4X6-inch microfiche contains up to 60 photo duplicates of the manual pages. The microfiche package also includes the latest Manual Changes supplement as well as all pertinent Service Notes.

1-5. Instrument specifications are listed in Table 1-1. The specifications are the performance standards or limits against which the instrument may be tested. Table 1-2 lists supplemental characteristics. Supplemental characteristics are not specifications but are typical characteristics included for the information of the user.

1-6. INSTRUMENTS COVERED BY MANUAL

1-7. This instrument has a two-part serial number. The first four digits followed by a letter comprise the serial number prefix. The last five-digits form the sequential suffix that is unique to each instrument. The content of this manual applies directly to instruments having the same serial number prefix as those listed on the title page under SERIAL NUMBER.

1-8. An instrument manufactured after the printing of this manual may have a serial prefix that is not listed on the title page. An unlisted serial prefix indicates that the instrument is different from those documented in this manual. The manual for this instrument is supplied with a yellow Manual Changes supplement that contains change information that documents the differences.

1-9. In addition to change information, the supplement may contain information for correcting errors in the manual. To keep this manual as current and accurate as possible, Hewlett-Packard recommends that you periodically request the latest Manual Changes supplement. The supplement for this manual is keyed to this manual's print date and part number, both of which appear on the title page. Complimentary copies of the supplement are available from Hewlett-Packard.

1-10. For information concerning a serial number prefix not listed on the title page or in the Manual Changes supplement, contact your nearest Hewlett-Packard office.

1-11. DESCRIPTION

1-12. The Model 8755A Swept Amplitude Analyzer makes swept measurements of return loss, insertion loss or gain, and power at microwave frequencies. The complete measurement system includes the Model 8755A Swept Amplitude Analyzer plugged into a 180-series Oscilloscope mainframe. Included in a measurement system are three detectors and a modulator. A dual-directional coupler and a microwave swept signal source are also required in a typical reflectometer test setup. The complete specifications are given in Table 1-1 and Supplemental Characteristics are given in Table 1-2.

1-13. A 27.8 kHz signal from the 8755A modulates the Model 11665A/B modulator, providing a modulated RF envelope to the three Model 11664A detectors. The audio modulation technique applied in the 8755A measurement system provides the benefit of virtually drift-free operation, compared to crystal detectors operated without modulation.

1-14. EQUIPMENT REQUIRED BUT NOT SUPPLIED

1-15. Detectors and Modulator

1-16. Three Model 11664A Detectors and a Model 11665A/B Modulator are accessories needed to make a measurement with the Model 8755A. These accessories were designed specifically for use with the Model 8755A to achieve high performance through the specified microwave range. See the individual Operating and Service Manuals for the 11664A Detector and 11665A/B Modulator for more detailed information on these accessories.

1-17. Oscilloscope Display

1-18. The Model 180-series Oscilloscope is used for the display and mainframe for the Model 8755A. It supplies all the power required to operate the 8755A. In order to be completely compatible to the 8755A, the 180D and 182C Oscilloscope must have Option 807 installed. This modification supplies retrace blanking and zero-offset recorder outputs.

1-19. Models 8755L and 8755M Frequency Response Test Sets

1-20. The 8755A Swept Amplitude Analyzer, together with the detectors, modulator, and oscilloscope display is available as a configured test set, HP Model 8755L or 8755M. The following is a list of instruments contained in each test set. Figure 1-2 shows the equipment.

Model 8755L

a. Model 8755A Swept Amplitude Analyzer

b. Model 182C Option 807 Oscilloscope Display

c. Model 11664A Detectors (3 each)

d. Model 11665B Modulator

Model 8755M

a. Model 8755A Swept Amplitude Analyzer

b. Model 180D Option 807 Oscilloscope Display

c. Model 11664A Detectors (3 each)

d. Model 11665B Modulator

1-21. Equipment Required for Reflectometer Test Setup

1-22. A reflectometer configuration is used to simultaneously measure both reflection and transmission gain or loss. A typical reflectometer test setup uses the following equipment:

a. Model 8755L or 8755M Frequency Response Test Set (includes 8755A, three 11664A detectors, 11665B modulator, and 180-series oscilloscope display).

b. Dual Directional Coupler (Model 778D, 0.1—2 GHz; Model 11692D, 2—18 GHz).

c. Sweep Oscillator (Model 8620A/B or 8690A/B) with plug-ins for bands of interest.

1-23. RECOMMENDED TEST EQUIPMENT

1-24. Equipment required to maintain the Model 8755A is listed in Table 1-3. Other equipment may be substituted if it meets or exceeds the critical specifications listed in the table

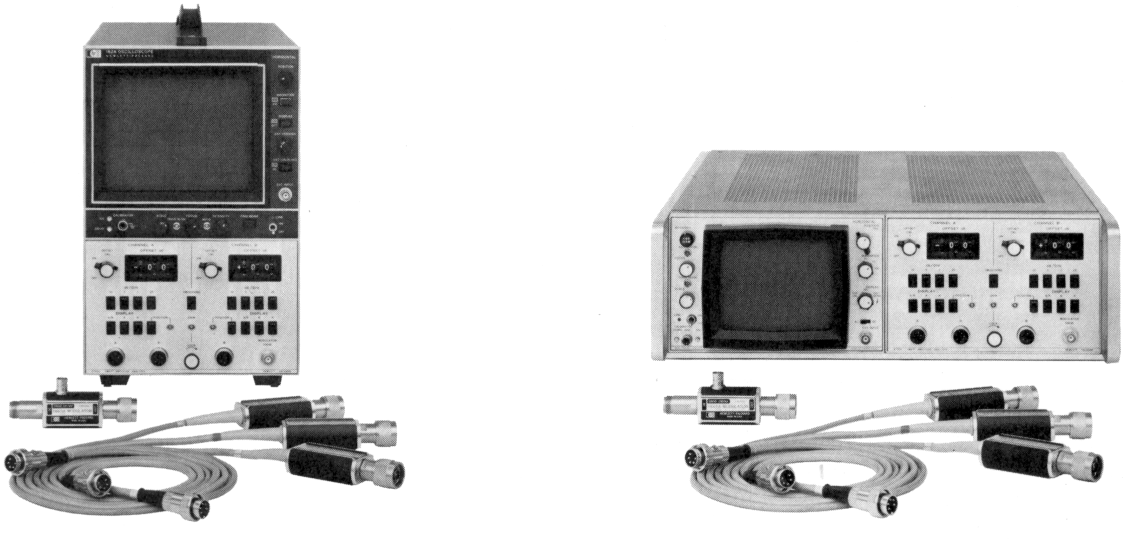


Figure 1-2. Models 8755L and 8755M Frequency Response Test Sets

Table 1-1. Specifications for Model 8755A

SPECIFICATIONS

MODEL 8755A ONLY

Function: Plug-in for 180 series oscilloscope. Has three input circuits (R, A, B) which process the 11664A Detector outputs.

Operating Frequency: 27.8 kHz

Modulator Drive: Provides nominal ±6 V from 50-Ohm source impedance at 27.8 kHz.

Net Weight: 6 lb., 4 oz (2, 8 kg)

MODEL 8755A OPERATING WITH MODEL 11664A DETECTORS AND MODEL 11665B MODULATOR

Function: A complete instrument for making swept frequency response measurements of return loss, transmission gain or loss, and power.

Frequency Range: 15 MHz to 18 GHz.

Measurement Range: Single Detector Signal: +10 dBm to —50 dBm (noise level). NOTE: Damage Level is +20 dBm (100 mW) power and 10 Vdc.
Ratio of Two Detector Signals: 60 dB

Frequency Response (Ratio Measurement):
See table below:

NOTE:
The frequency response error can be eliminated with standard grid line normalization techniques.

Frequency Range	Swept Measurement Uncertainty Due to Frequency Response Only
15 MHz to 8 GHz	⩽±0.15 dB
15 MHz to 10 GHz	⩽±0.2 dB
15 MHz to 12.4 GHz	⩽±0.3 dB
15 MHz to 14 GHz	⩽±0.45 dB
15 MHz to 15 GHz	⩽±0.5 dB
15 MHz to 18 GHz	⩽±0.6 dB

Ratio Measurement Accuracy:
See table below:

NOTE:
Accuracy figures show overall system uncertainty for a single detector measurement using the OFFSET dB controls. It is also the accuracy of a ratio measurement when the power level to one detector does not change level. If both detectors of a ratio measurement change level, after calibration, the total measurement uncertainty is the sum of the two detector accuracy uncertainties. Figures do not include frequency response, mismatch, or coupler ambiguities.

dB Change From Reference	Amplitude Accuracy
10 dB	⩽±0.9 dB
20 dB	⩽±1.1 dB
30 dB	⩽±1.1 dB
40 dB	⩽±1.1 dB
50 dB	⩽±1.1 dB
60 dB	⩽±1.9 dB

GENERAL

Resolution: Independent for each channel in steps of 10, 5, 1, or 0.25 dB per division. With Model 182A display, resolution is 1.29 cm/division and with Model 180D display, resolution is 1 cm/division.

Offset: ±59 dB in 1-dB steps. Each display channel is independent.

Recorder Outputs: 0.5 V/division with nominally 100 Ohms output impedance. (Option 807 must be installed in 180 series display.)

Marking and Blanking: Accepts marker and blanking inputs from HP 8620 and 8690 series Sweep Oscillators if Option 807 is installed in 180 or 182 Oscilloscope mainframe. Blanking input from 8620 connects to Z-AXIS INPUT; 8690B connects to AUX C. NOTE: Damage level is 20V P-P.

Temperature Range: Operation, 0 to 55 degrees C; storage, —40 degrees C to +75 degrees C.

Dimensions:

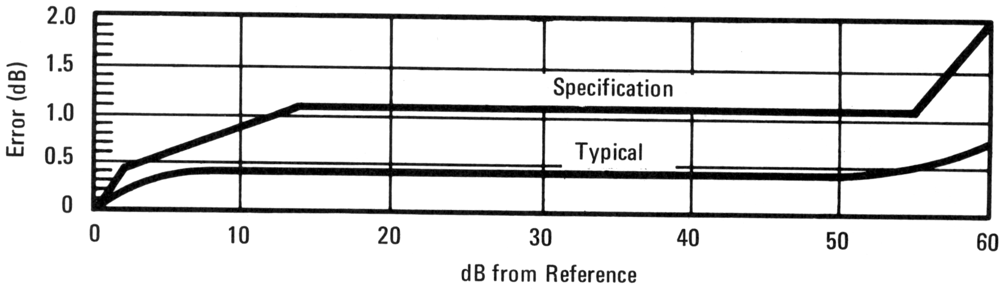
With 182C Display: 7-15/16 in. wide X 13-15/16 in. high X 19-5/8 in. deep overall (201, 6 X 338, 1 X 498, 5 mm).

With 180D Display: 16-3/4 in. wide X 5-7/32 in. high X 21-3/8 in. deep overall (425 X 132, 6 X 543 mm).

Table 1-2. Supplemental Characteristics of 8755A

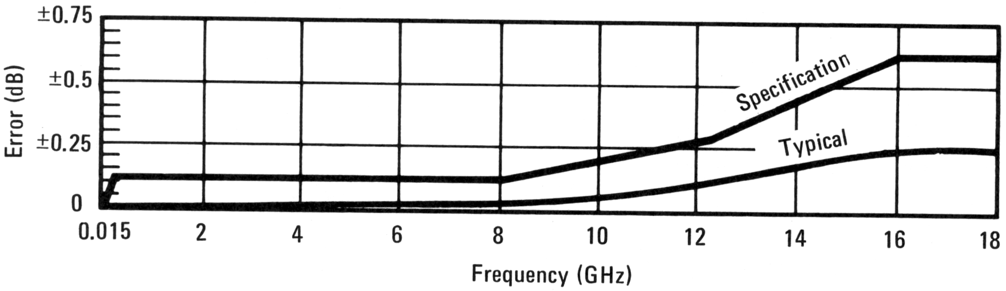
SUPPLEMENTAL CHARACTERISTICS

Ratio Measurement Accuracy:



Accuracy curve shows overall system uncertainty for a single detector measurement using the OFFSET dB controls; it is also the accuracy of a ratio measurement when the power level to one detector does not change level. If both detectors of a ratio measurement change level, after calibration, the total measurement uncertainty is the sum of the two detector accuracy uncertainties. Curve does not include frequency response, mismatch, or coupler ambiguities. The curve requires a calibration power level at +10 dBm.

Frequency Response (Ratio Measurement):



Note: The frequency response error can be eliminated with standard grid line normalization techniques.

Table 1-3. Recommended Test Equipment

Instrument	Critical Specification	Recommended Model	Use*
Oscilloscope mainframe for 8755A	HP 180 series with Option 807	HP 180 or 182 with Option 807	P,A,T
Oscilloscope	Vertical Bandwidth: 20 MHz minimum Vertical Sensitivity: 5 mV/DIV Horizontal Sweep Rate: 1μs/Div. max.	HP 180A/1801A/1820A	T
Detectors (3 Required)	Model 11664A only	HP 11664A	P,A,T
Modulator	Model 11665A/B only	HP 11665A/B	P,A,T
Sweep Oscillator	CW and swept frequency signal in 0.1 to to 18 GHz range	HP Model 8620 mainframe with: HP Model 8621B and: 86330B + 86320A (0.1 to 4.2 GHz) 86341B (3.2-6.5 GHz) 86342A (5.9-9 GHz) 86350A (8-12.4 GHz) HP 8620 mainframe with 86260A (12.4 to 18 GHz)	P,A,T
Attenuators (2 Required)	Attenuation: 3, 6, 10, 20 dB Accuracy: ±0.1 dB of calibration value SWR: <1.08 Range: DC to 18 GHz	HP 11582A	P,A,T
Power Splitting Tee	Attenuation each leg: 6 dB Range: DC to 18 GHz	Weinschel 1506A	P,A,T
Extractor Tool		HP 03950-4001	T
Extender Board	Pins: 15 each side	HP 5060-0049	T
DC Digital Voltmeter	Range: —50V to +50V Accuracy: 0.05%	HP 3460B	T
0-60 dB Step Attenuator (Calibrated)	Attenuation: 0 to 60 dB in 10 dB steps Input and Output Impedance: 50 Ohms Calibration Accuracy: ±0.04 dB Calibration Frequency: 100 MHz	HP 355D, Calibrated by Standards Laboratory	P,A,T
Directional Coupler	Frequency Range: 100 to 200 MHz Coupling Attenuation: 20 dB Nominal SWR: ⩽1.1	HP 778D	P
Power Meter and Thermistor Mount	Frequency: 100 MHz to 18 GHz Range: +10 dBm to —20 dBm	HP 432A/8478B	P,A,T
Service Cable	No substitute. Allows troubleshooting outside mainframe.	HP 5060-0303	T

* A = Adjustment; P = Performance Test; T = Troubleshooting

Table 1-4. Connectors on 180-Series Option 807 Oscilloscope

180-Series Scope Rear-Panel Connector	Equipment to Which It Connects	Function
AUX A	X-Y Recorder	8755A Channel A output
AUX B	X-Y Recorder	8755A Channel B output
CAUTION Marker and blanking signals must be < 20 V P-P or damage may result.		
Z-AXIS INPUT	8620A/B Z-AXIS output (marker and blanking) or 8690A/B MARKER output	When 8620A/B is used, it provides marker and blanking to CRT display. When 8690A/B is used, it provides marker to CRT display.
AUX C	8690A/B BLANKING	Provides retrace blanking to 8755 A when 8690A/B is used.

Table 1-5. Rear Interconnect Connector A11P1 Signals or Voltages

Pin on A11P1	Signal or Voltage
1	N. C.
2	N. C.
3	—100 Vdc from mainframe (not used)
4	N. C.
5	N. C.
6	ALT TRIGGER from mainframe (not used)
7	GROUND from mainframe (not used)
8	GROUND from mainframe
9	N. C.
10	N. C.
11	AUX D to mainframe rear panel
12	AUX C to mainframe rear panel for 8690-Series sweeper blanking input
13	RECORDER/AUX B, Channel B signal to mainframe rear panel
14	RECORDER/AUX A, Channel A signal to mainframe rear panel
15	GROUND from mainframe (not used)
16	115 Vac from mainframe (not used)
17	N. C.
18	BLANKING
19	GROUND from mainframe (not used)
20	GROUND from mainframe, (Blanking signal return)
21	BEAM FINDER circuit (—12.6 Vdc normal, +V for beam finder)
22	N. C.
23	N. C.
24	GROUND from mainframe
25	N. C.
26	N. C.
27	—100 Vdc from mainframe (not used)
28	—12.6 Vdc from mainframe
29	+15 Vdc from mainframe
30	+100 Vdc from mainframe
31	20 V pk-pk from mainframe (not used)
32	115 Vac COMMON from mainframe (not used)

SECTION II
INSTALLATION

2-1. INTRODUCTION

2-2. This section covers initial inspection, installation of the instrument into a mainframe, and storage and shipping requirements.

2-3. INITIAL INSPECTION

2-4. If the shipping container or cushioning material is damaged it should be kept until the contents of the shipment have been checked for completeness and the instrument has been checked mechanically and electrically. The contents of the shipment should be as shown in Figure 1-1, and procedures for checking electrical performance are given in Section IV. If the contents are incomplete, if there is mechanical damage or defect, or if the instrument does not pass the electrical performance test, notify the nearest Hewlett-Packard office. If the shipping container is damaged, or the cushioning material shows signs of stress, notify the carrier as well as the Hewlett-Packard office. Keep the shipping materials for carrier's inspection. The HP office will arrange for repair or replacement without waiting for claim settlement.

2-5. PREPARATION FOR USE

2-6. Installation

2-7. When properly installed, the Plug-in obtains all necessary power from the mainframe. The rear panel connector provides the interface.

2-8. To install the Plug-in into the mainframe:

a. Set Model 180-series mainframe line switch to off.

b. Slide the plug-in into place toward rear of the compartment.

c. Turn the "lock" knob located at the center of the front panel clockwise until the plug-in is held solidly in the mainframe.

2-9. To install each of the three 11664A detectors to the front panel of the 8755A:

a. Mate the 11664A cable connector to the 8755A detector input (A, B, or R).

b. Turn connector lock-ring clockwise to lock detector cable to 8755A.

c. Mount two matching plastic bands around each of the cables, one band near the connector and the other band near the detector.

2-10. Interconnection

2-11. The rear panel of the 180-series (Option 807) oscilloscope display contains connectors that provide various input and output functions to the 8755A as listed in Table 1-4. For 180-series oscilloscopes without Option 807, a kit is available (HP Part Number 00180-69508) to modify the 180, 181 or 182 rear-panel connectors.

2-12. Operating Environment

2-13. Temperature. The instrument may be operated in temperatures from 0°C to +55°C.

2-14. Humidity. The instrument may be operated in environments with humidity up to 95%. However, the instrument should also be protected from temperature extremes which cause condensation within the instrument.

2-15. Altitude. The instrument may be operated at altitudes up to 25,000 feet.

2-16. STORAGE AND SHIPMENT

2-17. Environment

2-18. The instrument may be stored or shipped in environments within the following limits:

Temperature:	—40°C to +75° C
Humidity:	Up to 95%
Altitude:	Up to 25,000 feet

The instrument should also be protected from temperature extremes which cause condensation within the instrument.

2-19. Packaging

2-20. Original Packaging. Containers and materials identical to those used in factory packaging are available through Hewlett-Packard offices. If the instrument is being returned to Hewlett-Packard for servicing, attach a tag indicating the type of service required, return address, model number, and full serial number. Also, mark the container FRAGILE to assure careful handling. In any correspondence, refer to the instrument by model number and full serial number.

2-21. Other Packaging. The following general instructions should be used for re-packaging with commercially available materials:

a. Wrap the instrument in heavy paper or plastic. (If shipping to a Hewlett-Packard office or service center, attach a tag indicating the type of service required, return address, model number, and full serial number.)

b. Use a strong shipping container. A double-wall carton made of 350-pound test material is adequate.

c. Use enough shock-absorbing material (3- to 4-inch layer) around all sides of the instrument to provide firm cushion and prevent movement inside the container. Protect the control panel with cardboard.

d. Seal the shipping container securely.

e. Mark the shipping container FRAGILE to assure careful handling.

SECTION III
OPERATION

3-1. INTRODUCTION

3-1. This section explains the function of the controls and indicators of the Model 8755A Swept Amplitude Analyzer.

3-3. PANEL FEATURES

3-4. Front panel features are described in Figure 3-1. Description numbers match the numbers on the illustration.

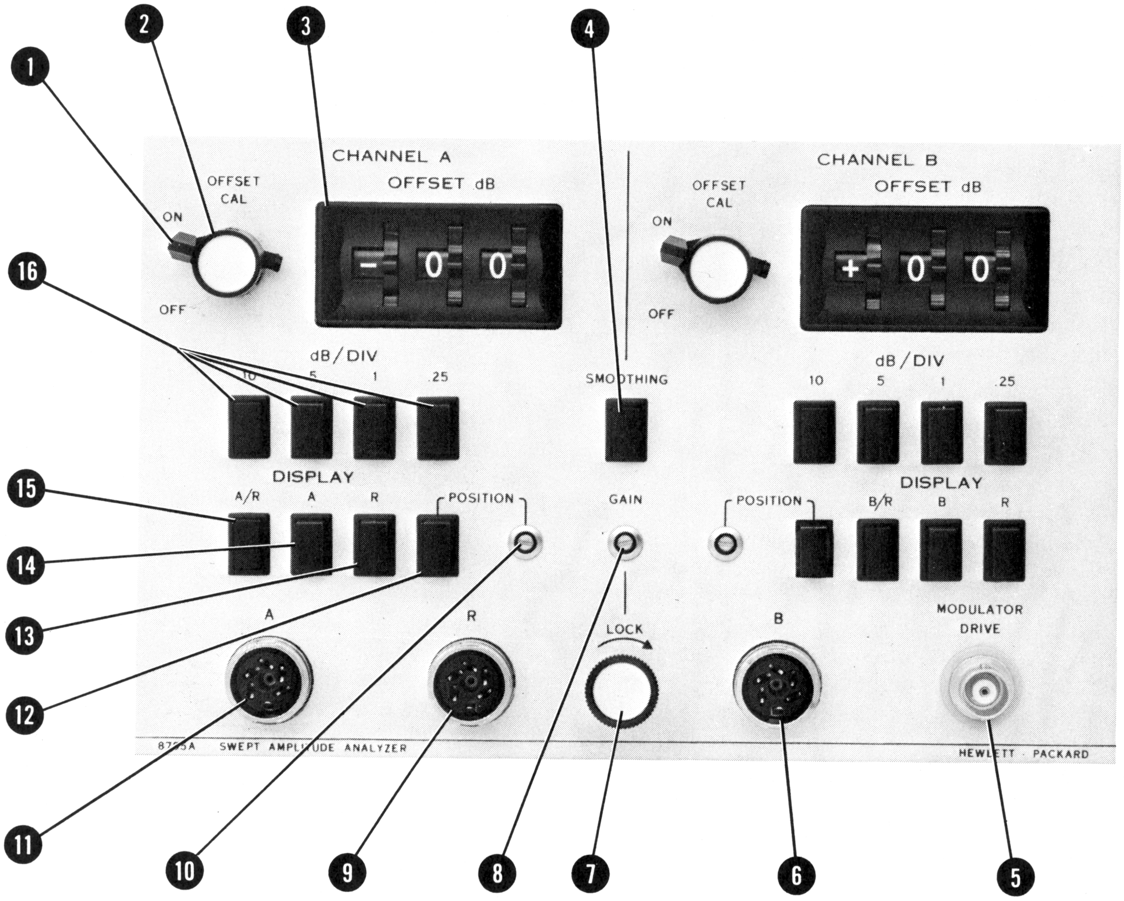
3-5. OPERATOR'S CHECK

3-6. Figure 3-2 is an operator's check procedure, allowing the operator to make a quick check of the main instrument functions prior to use. The operator's check assumes that the 8755A is installed in a 180-series oscilloscope mainframe. The test covers both the 8755A analyzer and mainframe; therefore, if the correct indications are not obtained, trouble may be in either unit. If the analyzer is suspected, use the performance test in Section IV to determine if the analyzer is working correctly. Otherwise, follow the troubleshooting tree in Section VIII to isolate the problem.

3-7. OPERATING INSTRUCTIONS

3-8. Figure 3-3 provides instructions for making transmission and reflection measurements. The test setup in Figure 3-3 shows a typical reflectometer test setup for simultaneously measuring reflection and transmission characteristics of a device under test. This test setup may vary considerably depending on the application. Select a low-pass filter with cut-off just above the frequency band of interest. The low-pass filter reduces spurious signals above the band of interest which could cause measurement inaccuracies. Select a dual directional coupler that is as flat as possible through the band of interest. The dual directional coupler may be replaced by two directional couplers connected back-to-back. Also, if only a transmission measurement is to be made, the dual directional coupler may be replaced by a power splitting tee. Before a measurement is made, the front panel GAIN control should be adjusted as described in Figure 3-1, callout 8.

FRONT PANEL FEATURES


1
2
3
4
16
15
14
13
12
11
10
9
8
7
6
5
CHANNEL A
OFFSET dB
OFFSET CAL
ON
OFF
dB/DIV
10
5
1
.25
DISPLAY
A/R
A
R
POSITION
SMOOTHING
GAIN
LOCK
A
R
B
CHANNEL B
OFFSET dB
OFFSET CAL
ON
OFF
dB/DIV
10
5
1
.25
POSITION
DISPLAY
B/R
B
R
MODULATOR DRIVE
8755A SWEPT AMPLITUDE ANALYZER
HEWLETT · PACKARD

NOTE

Channel A and Channel B are identical in Operation. Therefore, only Channel A controls are described.

① **OFFSET CAL ON/OFF Switch.** With this switch in the ON position, the display can be offset by adjusting the OFFSET CAL control [2]. With the OFFSET CAL ON/OFF switch in the OFF position, the OFFSET CAL control has no effect.

② **OFFSET CAL Control.** Provides continuously variable offset (>±35 dB) of the display when OFFSET CAL ON/OFF switch [1] is in the ON position.

③ **OFFSET dB Control.** This control has three thumb wheels. The thumb wheel farthest left sets the polarity of the offset (+ or —). The center thumb wheel adjusts the offset of the display in 10 dB steps. The thumb wheel on the right adjusts offset of the display in 1 dB steps.

④ **SMOOTHING Pushbutton Switch.** When this switch is depressed, the noise component is filtered from the 8755A display. Pressing this control a second time releases it.

NOTE

When SMOOTHING control is depressed, the bandwidth of the 8755A is greatly reduced (from the normal 10 kHz to 300 Hz). This may require a corresponding adjustment to the sweep speed.

⑤ **MODULATOR DRIVE Output Connector.** This connector provides a 27.8 kHz square wave output signal, nominally ±6 volts, to drive the modulator, HP Model 11665A/B.

Figure 3-1. Front Panel Controls and Connectors (1 of 2)

FRONT PANEL FEATURES

⑥ **Detector B Input Connector.** Provides the input connection for the B detector, HP Model 11664A. This connector receives the detector output signal as well as supplying power through the detector cable to the preamplifier located within the detector.

⑦ **LOCKing Knob.** Turning this knob in the direction of the arrow locks the 8755A in the oscilloscope mainframe. Turning this knob in the direction opposite the arrow releases the 8755A from the mainframe.

⑧ **GAIN Control.** Compensates for a difference in vertical gain of different oscilloscope mainframes. The GAIN control is adjusted so the trace on the oscilloscope moves exactly four divisions from the center graticule line when the OFFSET dB is changed from +00 to +01 with the 8755A set for greatest resolution (.25 dB/DIV). When the polarity of the offset is changed to minus (—01 set in OFFSET dB), the trace should move exactly four divisions to the opposite side of the center graticule line. This adjustment should be done with sweep oscillator set for minimum sweep width so a flat response is observed on the CRT display. Since the GAIN control is common to both channels, it may be adjusted, observing channel A display (A/R) or channel B display (B/R).

⑨ **Detector "R" (Reference) Input Connector.** Provides the input connection for the reference detector, HP Model 11664A. This connector receives the detector output signal as well as supplying power through the detector cable to the preamplifier located within the detector.

⑩ **DISPLAY POSITION Control.** When POSITION pushbutton **[12]** is depressed, the DISPLAY POSITION screwdriver adjustment may be adjusted for a trace positioned anywhere between the top and bottom extremes of the oscilloscope screen. When the resolution is increased, the CRT trace will be expanded about the reference graticule line at which the position trace is adjusted.

⑪ **Detector "A" Input Connector.** Provides the input connection for the "A" detector, HP Model 11664A. This connector receives the detector output signal as well as supplying power through the detector cable to the preamplifier located within the detector.

⑫ **DISPLAY POSITION Pushbutton Switch.** When this switch is depressed, DISPLAY POSITION control **[10]** can be adjusted for a CRT trace positioned anywhere between the top and bottom extremes of the oscilloscope screen for convenient reference. Also when this switch is depressed it overrides the OFFSET CAL, OFFSET dB, and resolution (dB/DIV) controls.

⑬ **DISPLAY R Pushbutton Switch.** When this switch is depressed, the 8755A displays the reference input signal level (from detector R input connector **[9]**).

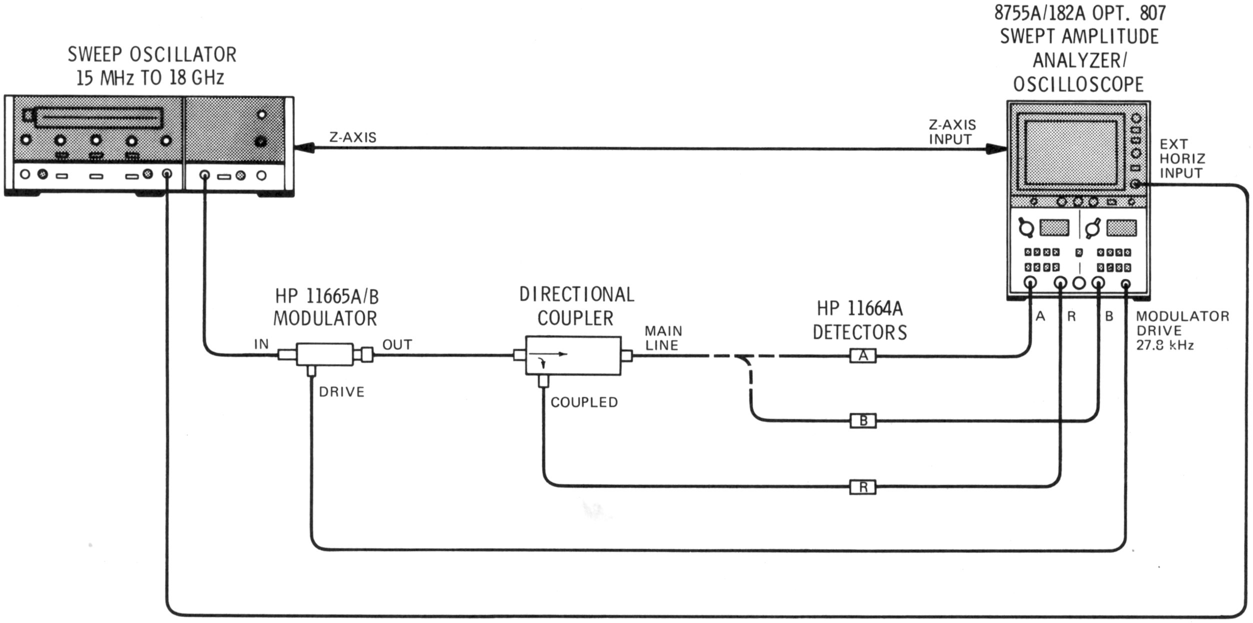
⑭ **DISPLAY A Pushbutton Switch.** When this switch is depressed, the 8755A displays the signal level of input A (from detector A input connector **[11]**).

⑮ **DISPLAY A/R Pushbutton Switch.** When this switch is depressed, the 8755A displays the signal level of A in dB minus the signal level of R in dB ($A_{dB} - R_{dB}$ = A/R). This mathematical relationship exists because the logarithmic function A/R is performed by simple subtraction.

⑯ **dB/DIV Resolution Pushbutton Switches.** These switches select channel vertical resolution of .25, 1, 5, or 10 dB per dividion.

Figure 3-1. Front Panel Controls and Connectors (2 of 2)

OPERATOR'S CHECK


SWEEP OSCILLATOR
15 MHz TO 18 GHz
8755A/182A OPT. 807
SWEPT AMPLITUDE
ANALYZER/
OSCILLOSCOPE
Z-AXIS
Z-AXIS
INPUT
EXT
HORIZ
INPUT
HP 11665A/B
MODULATOR
IN
OUT
DRIVE
DIRECTIONAL
COUPLER
MAIN
LINE
COUPLED
HP 11664A
DETECTORS
A
B
R
A
R
B
MODULATOR
DRIVE
27.8 kHz

Operator's Check Test Setup

Initial Adjustment

a. Connect equipment as shown in the test setup with 11664A detector "A" connected to directional coupler.

CAUTION

Set sweep oscillator POWER LEVEL fully counterclockwise (minimum power). If power level exceeds +15 dBm, damage to the 11664A detector may result.

b. Set CHANNEL A and CHANNEL B controls as follows:

OFFSET CAL	OFF
OFFSET dB	—00 dB
dB/DIV	10
DISPLAY	POSITION
SMOOTHING	OFF (OUT)

c. Set the sweep oscillator for the selected frequency band. Select the ΔF sweep mode and the narrowest sweep width.

d. Press one of the CHANNEL B DISPLAY pushbuttons partially in to "pop" all of the switches out to turn off the CHANNEL B trace.

Figure 3-2. Operator's Check (1 of 2)

e. Press CHANNEL A DISPLAY POSITION switch. Adjust CHANNEL A POSITION screwdriver adjustment to position the CRT trace on the center graticule line.

Detector "A" Test

f. Press CHANNEL A DISPLAY A pushbutton. Adjust sweep oscillator POWER LEVEL control to place the CRT trace on the center graticule line. Press other CHANNEL A dB/DIV pushbuttons to select progressively more sensitive ranges and make fine adjustment of sweep oscillator POWER LEVEL control.

NOTE

This sweeper power setting places zero dBm at the "A" detector input. However, if this signal were measured with a power meter, the indication would be —3 dBm because of the symmetrical squarewave modulation in the 11665A. This modulation reduces the average power output by 3 dB (half power).

Vertical GAIN Adjustment

g. Depress CHANNEL A 10 dB/DIV pushbutton. Set CHANNEL A OFFSET dB to —40 dB. The trace should move to the top graticule line (4 divisions). Change OFFSET dB to +40. The trace should move to the bottom graticule line. If not, adjust GAIN screwdriver adjustment.

Detector "R" Test

h. Set CHANNEL A OFFSET dB to —00. Depress CHANNEL A 10 dB/DIV and CHANNEL A DISPLAY R pushbuttons. The CRT trace should indicate the coupling factor of the directional coupler being used.

A/R Ratio Test

i. Depress the CHANNEL A DISPLAY A/R pushbutton. With zero dBm applied to the A detector the ratio of A/R should indicate the coupling factor of the directional coupler being used.

Detector "B" Test

j. Disconnect the "A" detector from the directional coupler and connect the "B" detector in its place.

k. Press one of the CHANNEL A DISPLAY pushbuttons partially in to "pop" all of the switches out to turn off the CHANNEL A trace.

l. Press CHANNEL B DISPLAY POSITION switch. Adjust CHANNEL B POSITION screwdriver adjustment to position the CRT trace on the center graticule line.

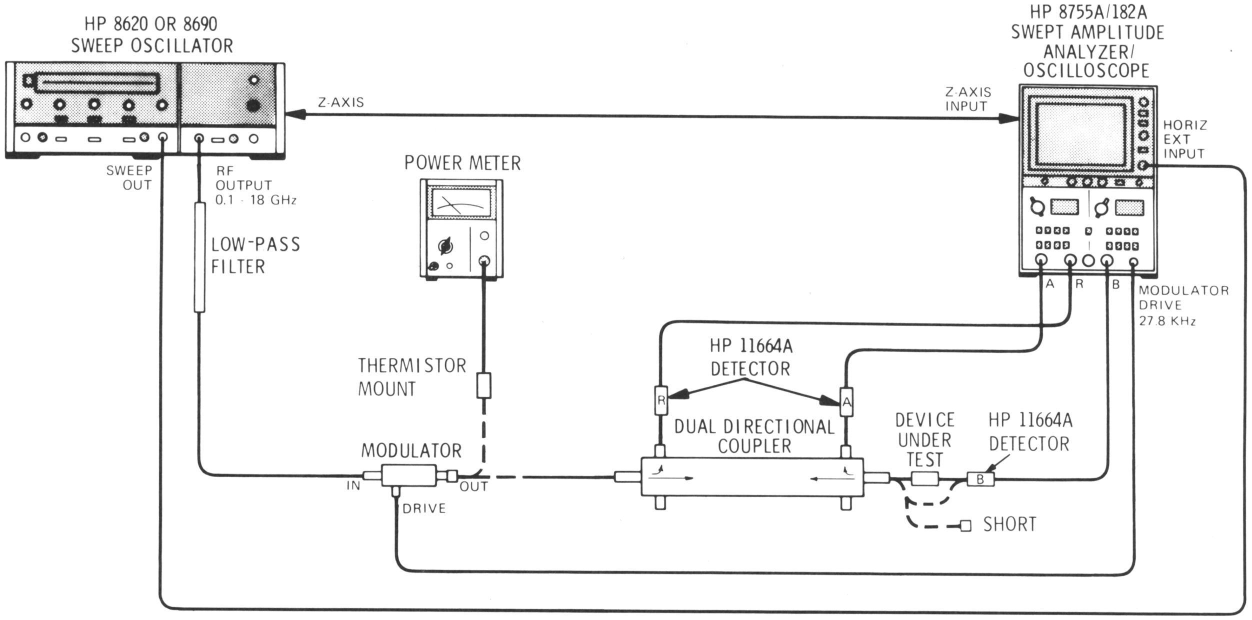
m. Set CHANNEL B OFFSET dB to —00. Depress CHANNEL B 10 dB/DIV and CHANNEL B DISPLAY B pushbuttons. The CRT trace should be near the center graticule line.

B/R Ratio Test

n. Depress CHANNEL B DISPLAY B/R pushbutton and set CHANNEL B OFFSET dB to equal the coupling factor of the directional coupler being used. The CRT trace should be near the center graticule line.

Figure 3-2. Operator's Check (2 of 2)

TRANSMISSION, REFLECTION, AND POWER MEASUREMENT


HP 8620 OR 8690
SWEEP OSCILLATOR
SWEEP OUT
RF OUTPUT 0.1 - 18 GHz
LOW-PASS FILTER
Z-AXIS
POWER METER
THERMISTOR MOUNT
MODULATOR
IN
OUT
DRIVE
HP 11664A DETECTOR
R
A
DUAL DIRECTIONAL COUPLER
DEVICE UNDER TEST
HP 11664A DETECTOR
B
SHORT
HP 8755A/182A
SWEPT AMPLITUDE
ANALYZER/
OSCILLOSCOPE
Z-AXIS INPUT
HORIZ EXT INPUT
A
R
B
MODULATOR DRIVE 27.8 KHz

Model 8755A Typical Measurement Setup

TRANSMISSION MEASUREMENT

To Make a Transmission Measurement:

a. Connect equipment as shown in the test setup with no device under test connected and the B detector connected directly to the output of the dual directional coupler.

b. Press one of the CHANNEL A DISPLAY pushbuttons part way in to "pop" all the CHANNEL A DISPLAY pushbuttons out to turn off the CHANNEL A display.

c. On CHANNEL B panel, set OFFSET CAL to OFF, OFFSET dB to —00, and press 10 dB/DIV switch. Press DISPLAY POSITION SWITCH and adjust POSITION screwdriver adjustment to place the CRT trace on any convenient graticule line for a "reference". (If the device under test has attenuation or loss, place the reference line near the top of the CRT. If the device under test has gain, place the reference near the bottom of the CRT.)

CAUTION

> The following equipment setup assumes that the device under test has less than 10 dB of gain. If not, the sweep oscillator power level must be reduced to prevent >+15 dBm signal at channel B 11664A detectors or damage may result.

d. Press CHANNEL B DISPLAY B pushbutton. Increase sweep oscillator POWER LEVEL to place the CRT trace to the line one division above the reference graticule line. (This is approximately +10 dBm from the sweep oscillator.) If the sweep oscillator does not have sufficient power to obtain this level, set POWER LEVEL to maximum.

Figure 3-3. Transmission, Reflection, and Power Measurements (1 of 4)

TRANSMISSION, REFLECTION, AND POWER MEASUREMENT

e. Press CHANNEL B DISPLAY B/R pushbutton. Set the OFFSET CAL ON/OFF switch to ON and adjust OFFSET CAL control to place one end of the CRT trace on the "reference" graticule line established in step c. To make fine adjustment, increase resolution by depressing .25 dB/DIV switch. The instrument is now ready to make a transmission measurement. Do not move the OFFSET CAL control or calibration will be destroyed.

f. Select 10 dB/DIV resolution. Connect a device under test between the output of the dual directional coupler and the channel B 11664A detector.

g. Adjust CHANNEL B OFFSET dB switches to bring the trace back to near the "reference" graticule line. If the device under test has attenuation, the OFFSET dB switch setting will have a negative sign. Gain is indicated if the switch sign is positive. When measuring attenuation, the total attenuation of the device is obtained by adding the OFFSET dB setting to the attenuation indication of the CRT trace below the "reference" graticule line. (If the trace is above the "reference" line, subtract this amount from the OFFSET dB setting to obtain the net attenuation.) When calculating gain, add the OFFSET dB switch setting to the CRT display above the "reference" graticule line or subtract the amount below the "reference" graticule line.

REFLECTION MEASUREMENT

To Make a Reflection Measurement:

a. Connect equipment as shown in the test setup with no device under test connected and a type-N short connected to the coupler main-line output connector.

b. Press one of the CHANNEL B DISPLAY pushbuttons part way in to "pop" all of the CHANNEL B DISPLAY pushbuttons out to turn off the CHANNEL B display.

c. On CHANNEL A panel, set OFFSET CAL to OFF, OFFSET dB to —00, and press 10 dB/DIV switch. Press DISPLAY POSITION switch and adjust POSITION screwdriver adjustment to place the CRT trace on another "reference" graticule line near the top of the CRT.

d. Press CHANNEL A DISPLAY A pushbutton and adjust sweep oscillator POWER LEVEL to place the CRT trace near the "reference" graticule line. If sweep oscillator does not have sufficient power to obtain this level, set POWER LEVEL to maximum. (If coupling of dual directional coupler is 20 dB, the trace should be approximately one division below the "reference" graticule line for +10 dBm output from the sweep oscillator.)

e. Press CHANNEL A DISPLAY A/R pushbutton. Set OFFSET CAL ON/OFF switch to ON. Adjust OFFSET CAL control to place the CRT trace on the "reference" graticule line. Select .25 dB/DIV to make fine adjustment. The instrument is now ready to make a reflection measurement.

f. Select 10 dB/DIV resolution. Remove short from dual directional coupler output port and connect device under test to coupler. Adjust CHANNEL A OFFSET dB switches to place the CRT trace as close to the "reference" graticule line as possible. The return loss may be read directly by adding the setting of the CHANNEL A OFFSET dB switches to the trace position below the "reference" graticule line. If the trace is above the "reference" line, subtract that amount from the OFFSET dB switch setting.

Figure 3-3. Transmission, Reflection, and Power Measurements (2 of 4)

TRANSMISSION, REFLECTION, AND POWER MEASUREMENT

COMBINATION TRANSMISSION AND REFLECTION MEASUREMENT

The test setup shown allows simultaneous measurement of transmission and reflection. The reflection measurement is performed on the CHANNEL A side of the front panel and transmission measurement on CHANNEL B side. Make the calibration and adjustment described in steps a. through e. of the "TRANSMISSION MEASUREMENT" procedure. Do not change the sweep oscillator power setting after this point, but make all of the adjustments described in steps a. through e. of the "REFLECTION MEASUREMENT" procedure. Now the device under test may be placed in the test setup. Reflection is displayed by the CHANNEL A CRT trace and transmission is displayed by the CHANNEL B trace.

POWER MEASUREMENT

NOTE

The three 11664A Detectors and the 8755A are designed so that with no offset, the display indicates the power applied to the detectors. The power to the detectors is modulated with a symmetrical square wave; the average of the modulated signal is 3 dB below the unmodulated level. The 8755A display indicates the unmodulated power level ± approximately 2 dB. Greater accuracy can be obtained by calibrating the display using a power meter as described in the second paragraph below.

NOTE

For brevity, only measurements with Detector "B" are described in the procedure. However, any one of the three detectors may be used for power measurements.

To Make a Power Measurement:

a. Turn off the CHANNEL A display by pressing one of the CHANNEL A DISPLAY pushbuttons part way in to "pop" all of the CHANNEL A DISPLAY pushbuttons out.

b. Press the CHANNEL B DISPLAY POSITION pushbutton and adjust POSITION screwdriver adjustment to place the CRT trace on the center graticule line. (With OFFSET dB switches at 00 dB and the OFFSET CAL switch at OFF, the center graticule line is now zero dBm reference.)

c. Set CHANNEL B OFFSET CAL switch to OFF and OFFSET dB to —00. Press 10 dB/DIV and DISPLAY B pushbuttons.

d. Connect the "B" detector to the device under test or any other signal point of interest at the modulator output as shown in the test setup. Select a power point of interest on the CRT trace for a power measurement. Offset that point to the center graticule line with the CHANNEL B OFFSET dB thumbwheel switches. If the selected point on the CRT trace is now directly on the center line, the power level in dBm may be read directly from the OFFSET dB switch. (The OFFSET dB switch setting is the power level in dBm of the center graticule line.)

Figure 3-3. Transmission, Reflection, and Power Measurements (3 of 4)

TRANSMISSION, REFLECTION, AND POWER MEASUREMENT

e. Increase the resolution of the reading by pressing the 5, 1, or .25 dB/DIV pushbuttons. If, for instance, .25 dB/DIV resolution were selected and the OFFSET dB switch were setting at —31 dB, then the center line would be —31 dBm, one division above the center graticule line would be —30.75 dBm, and one division below the center line would be —31.25 dBm.

To Calibrate for Greater Accuracy:

a. Turn off the CHANNEL A display by pressing one of the CHANNEL A DISPLAY pushbuttons part way in to "pop" all of the CHANNEL A DISPLAY pushbuttons out.

b. Press the CHANNEL B DISPLAY POSITION pushbutton and adjust POSITION screwdriver adjustment to place the CRT trace on the center graticule line.

c. Set sweep oscillator for ΔF operation over the narrowest sweep width.

d. Connect power meter thermistor mount to the modulator output. Adjust sweep oscillator POWER LEVEL control for a power meter indication of —3 dBm.

e. Disconnect thermistor mount from modulator and connect "B" detector to modulator.

f. Set CHANNEL B OFFSET dB switches to —00 and press 10 dB/DIV and DISPLAY B pushbuttons. Set CHANNEL B OFFSET CAL switch to ON and adjust OFFSET CAL control to place the CRT trace on the center graticule line. The center graticule line is now calibrated for zero dBm. To maintain calibration, do not adjust CHANNEL B OFFSET CAL control again during test.

g. Connect the "B" detector to the device under test or any other signal point of interest at the modulator output as shown in the test setup. Select a power point of interest on the CRT trace for the power measurement. Offset the selected point to the center graticule line with the CHANNEL B OFFSET dB thumbwheel switches. If the point on the CRT trace is now directly on the center line, the power level in dBm may be read directly from the OFFSET dB switches. (The OFFSET dB switch setting is the power level in dBm of the center graticule line.)

h. Increase the resolution of the reading by pressing the 5, 1, or .25 dB/DIV pushbuttons. If, for instance, .25 dB/DIV resolution were selected and the OFFSET dB switch were setting at —31 dB, then the center line would be —31 dBm; one division above the center graticule line would be —30.75 dBm, and one division below the center line would be —31.25 dBm.

Figure 3-3. Transmission, Reflection, and Power Measurements (4 of 4)

SECTION IV
PERFORMANCE TESTS

4-1. INTRODUCTION

4-2. The procedures in this section test the instrument electrical performance using the specifications of Table 1-1 as the performance standards. All tests can be performed without access to the interior of the instrument. A simpler operational test is included in Section III under Operator's Checks.

4-3. EQUIPMENT REQUIRED

4-4. Equipment required for the performance tests is listed in the Recommended Test Equipment Table in Section I. Any equipment that satisfies the critical specifications given in the table may be substituted for the recommended model(s).

4-5. TEST RECORD

4-6. Results of the performance tests may be tabulated on the Test Record at the end of the procedures. The Test Record lists all of the tested specifications and their acceptable limits. Test results recorded at incoming inspection can be used for comparison in periodic maintenance and troubleshooting and after repairs or adjustments.

NOTE

These procedures assume that the 180-series oscilloscope mainframe is fully calibrated to its specifications.

PERFORMANCE TESTS

4-7. AMPLITUDE ACCURACY

SPECIFICATION: Amplitude accuracy of the Model 8755A Swept Amplitude Analyzer together with three Model 11664A Detectors and a Model 11665A/B Modulator is shown in Table 4-1.

Table 4-1. Amplitude Accuracy of Model 8755A Connected with Three Model 11664A Detectors and a 11665A/B Modulator

dB Change From Reference	Amplitude Accuracy
10 dB	⩽±0.9 dB
20 dB	⩽±1.1 dB
30 dB	⩽±1.1 dB
40 dB	⩽±1.1 dB
50 dB	⩽±1.1 dB
60 dB	⩽±1.9 dB

DESCRIPTION: The 8755A is connected as shown in Figure 4-1. An initial calibration of gain within the oscilloscope display is made. Then precision attenuators are used to vary the input level to the channel under test. With no attenuation, a reference level is set. Attenuators are then inserted in 10 dB steps and the resulting response is measured.

PERFORMANCE TESTS

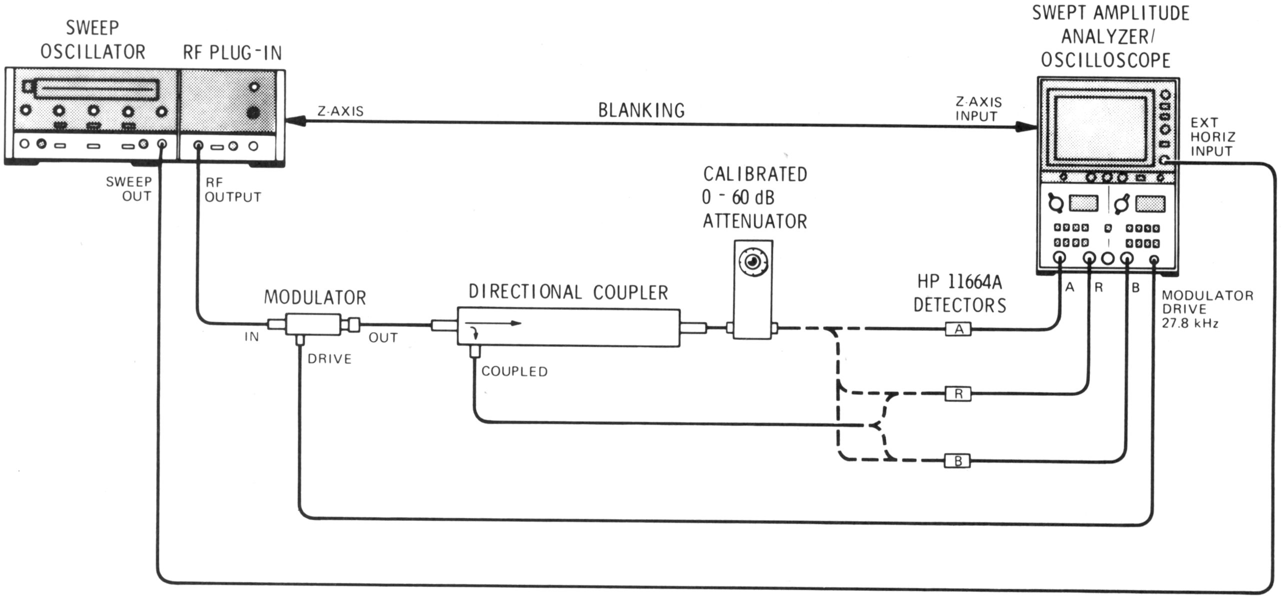

SWEEP OSCILLATOR
RF PLUG-IN
Z-AXIS
BLANKING
Z-AXIS INPUT
SWEPT AMPLITUDE ANALYZER/ OSCILLOSCOPE
EXT HORIZ INPUT
SWEEP OUT
RF OUTPUT
CALIBRATED 0 - 60 dB ATTENUATOR
MODULATOR
DIRECTIONAL COUPLER
HP 11664A DETECTORS
A
R
B
MODULATOR DRIVE 27.8 kHz
IN
OUT
DRIVE
COUPLED
A
R
B

Figure 4-1. Amplitude Accuracy Test Setup

EQUIPMENT:

Swept Amplitude Analyzer/Oscilloscope	HP 8755A/182A
Detectors (3 required)	HP 11664A
Modulator	HP 11665A/B
Sweep Oscillator	HP Model 8620 Mainframe with: HP Model 8621B and 86330B + 86320A (0.1 to 4.2 GHz)
0-60 dB Attenuator	HP 355D (Calibrated)
Directional Coupler	HP 778D

PROCEDURE:

Initial Adjustment

a. Connect equipment as shown in Figure 4-1 with detector "R" connected to incident coupled port of directional coupler and detector "A" connected to 0-60 dB attenuator. Set 0-60 dB attenuator to zero dB.

b. Set Channel A controls as follows:

OFFSET CAL	OFF
OFFSET dB	+10 dB
dB/DIV	10
DISPLAY	POSITION
SMOOTHING	OFF (OUT)

c. Set the sweep oscillator for 100 MHz. Select ΔF sweep mode and the narrowest sweep width.

PERFORMANCE TESTS

4-7. AMPLITUDE ACCURACY (cont'd)

d. Press CHANNEL A DISPLAY POSITION switch. Adjust CHANNEL A POSITION screwdriver adjustment to position the CRT trace on the center graticule line.

e. Press CHANNEL A DISPLAY A pushbutton. Adjust sweep oscillator POWER LEVEL control to place the CRT trace on the center graticule line. Press other CHANNEL A dB/DIV pushbuttons to select progressively more sensitive ranges and make fine adjustment of sweep oscillator POWER LEVEL control.

NOTE

This adjustment places +10 dBm at the detector input. However, if this signal were measured with a power meter, the indication would be +7 dBm because of the symmetrical square-wave modulation in the 11665A. This modulation reduces the average power output by 3 dB (half power).

NOTE

If the sweep oscillator does not provide +12 dBm output level, reduce the output to approximately +2 dBm. This should place the CRT trace approximately one division below the center graticule line. This does not allow testing the 0 to +10 dBm range of the 8755A. Therefore, use only up to 50 dB but not 60 dB of attenuation in steps h, j, and l of this test.

Gain Adjustment

f. Press CHANNEL A 5 dB/DIV switch. CHANNEL A OFFSET dB should be at +10. Change OFFSET dB polarity switch from + to — and CRT trace should move four divisions. If not, adjust front panel GAIN screwdriver adjustment to obtain four divisions of change between + and — position.

Detector "A" Amplitude Accuracy Test

g. Press CHANNEL A DISPLAY A/R pushbutton. Set CHANNEL A dB/DIV switch to 10. Set CHANNEL A OFFSET CAL ON/OFF switch to ON and adjust control to place CRT trace on the line two divisions above the center line.

NOTE

If the sweep oscillator is set for +2 dBm output in step e, do not test with 60 dB of attenuation in step h.

h. Insert 10, 20, 30, 40, 50, and 60 dB of attenuation with 0-60 dB attenuator. The CRT trace should move down one division for each added 10 dB of attenuation ± the tolerance limits shown in Table 4-1 and ± the calibration correction of the attenuator.

Detector "B" Amplitude Accuracy Test

i. Disconnect "A" detector from 0-60 dB attenuator and connect "B" detector in its place. Press CHANNEL B DISPLAY B/R pushbutton. Set CHANNEL B dB/DIV switch to 10. Set CHANNEL B OFFSET CAL ON/OFF switch to ON and adjust control to place CRT trace on the line two divisions above the center line.

PERFORMANCE TESTS

4-7. AMPLITUDE ACCURACY (cont'd)

NOTE

> If the sweep oscillator is set for +2 dBm output in step e, do not test with 60 dB of attenuation in step j.

j. Insert 10, 20, 30, 40, 50, and 60 dB of attenuation with 0-60 dB attenuator. The CRT trace should move down one division for each added 10 dB of attenuation ± the tolerance limits shown in Table 4-1 and ± the calibration correction of the attenuator.

Detector "R" Amplitude Accuracy Test

k. Reverse the "B" and "R" detectors in the test setup, connecting the "R" detector to the 0-60 dB attenuator and the "B" detector to the incident coupled port of the directional coupler. Press CHANNEL B DISPLAY B/R pushbutton. Set CHANNEL B dB/DIV switch to 10. Set CHANNEL B OFFSET CAL ON/OFF switch to ON and adjust control to place the CRT trace on the line two divisions below the center line.

NOTE

> If the sweep oscillator is set for +2 dBm output in step e, do not test with 60 dB of attenuation in step l.

l. Insert 10, 20, 30, 40, 50, and 60 dB of attenuation with 0-60 dB attenuator. The CRT trace should move up one division for each added 10 dB of attenuation ± the tolerance limits shown in Table 4-1 and ± the calibration correction of the attenuator.

4-8. FREQUENCY RESPONSE

SPECIFICATION: Measurement uncertainty due to the frequency response of the 8755A, 11664A, and 11665A/B in a two detector ratio measurement are shown in Table 4-2.

Table 4-2. Frequency Response When Measuring the Ratio of Two Detector Signals

Frequency Range	Swept Measurement Uncertainty Due to Frequency Response Only
100 MHz to 8 GHz	⩽± 0.15 dB
100 MHz to 10 GHz	⩽± 0.2 dB
100 MHz to 12.4 GHz	⩽± 0.3 dB
100 MHz to 14 GHz	⩽± 0.45 dB
100 MHz to 15 GHz	⩽± 0.5 dB
100 MHz to 18 GHz	⩽± 0.6 dB

DESCRIPTION: The ratio of two detectors is measured, using the greatest resolution (.25 dB/DIV) position. Variations of the CRT trace are measured. These represent measurement ambiguity due to the frequency response of the instrument over the swept band.

PERFORMANCE TESTS

4-8. FREQUENCY RESPONSE (cont'd)

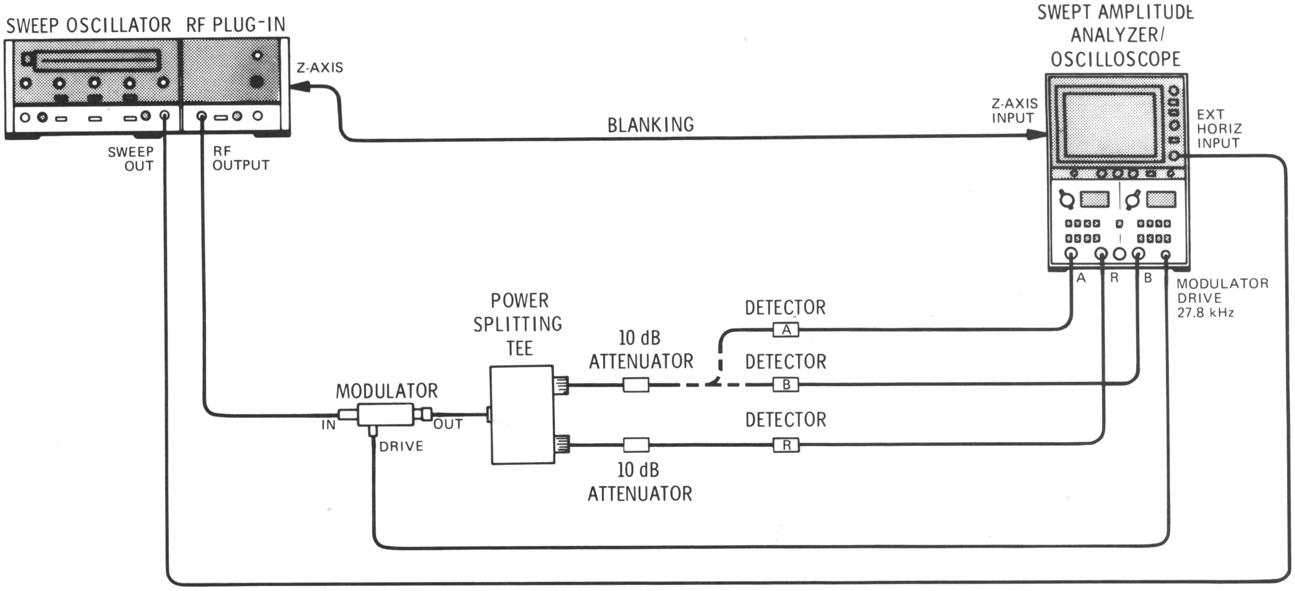

SWEEP OSCILLATOR
RF PLUG-IN
Z-AXIS
SWEEP OUT
RF OUTPUT
BLANKING
SWEPT AMPLITUDE ANALYZER/ OSCILLOSCOPE
Z-AXIS INPUT
EXT HORIZ INPUT
A
R
B
MODULATOR DRIVE 27.8 kHz
POWER SPLITTING TEE
10 dB ATTENUATOR
DETECTOR
A
DETECTOR
B
DETECTOR
R
MODULATOR
IN
OUT
DRIVE
10 dB ATTENUATOR

Figure 4-2. Frequency Response Test Setup

EQUIPMENT:

Swept Amplitude Analyzer/Oscilloscope	HP 8755A/182A
Detectors (3 required)	HP 11664A
Modulator	HP 11665A/B
Sweep Oscillator	HP Model 8620 mainframe with: HP Model 8621B and 86330B + 86320A (0.1 to 4.2 GHz) 86341B (3.2 to 6.5 GHz) 86342A (5.9 to 9 GHz) 86350A (8.0 to 12.4 GHz) HP Model 8620 mainframe with: 86260A (12.4 to 18 GHz)
Power Splitting Tee	Weinschel 1506A
10 dB Attenuators (2 required)	HP 8491A Opt. 010

PROCEDURE:

a. Connect equipment as shown in Figure 4-2 with Detector A connected.

b. Adjust sweep oscillator for swept mode across the widest band.

c. Press one of the CHANNEL B DISPLAY pushbuttons partially in to "pop" all of the switch buttons out to turn off the Channel B trace.

d. Set CHANNEL A OFFSET CAL ON/OFF switch to OFF, OFFSET dB to -00, 10 dB/DIV switch depressed, and DISPLAY POSITION switch depressed. Adjust POSITION screwdriver adjustment to place the trace on the center graticule line of the CRT.

4-8. FREQUENCY RESPONSE (cont'd)

e. Press CHANNEL A DISPLAY A pushbutton. Adjust sweep oscillator POWER LEVEL control to place the CRT trace approximately one division below the center graticule line.

NOTE

> Power level of +10 dBm from the sweep oscillator should place the CRT trace about one division below the center line.

f. Press CHANNEL A DISPLAY A/R pushbutton and set OFFSET CAL ON/OFF switch to ON. Adjust OFFSET CAL control to place the CRT trace on the center graticule line. Select .25 dB/DIV to make final adjustment. The CRT trace should be within the specification limits shown in Table 4-2.

g. Repeat the procedure for other frequency bands of interest.

h. Repeat the procedure for Channel B and the B detector. The instructions are the same except use CHANNEL B controls instead of CHANNEL A. Also connect the B detector to the attenuator and power splitting tee instead of the A detector.

Table 4-3. Performance Test Record

Hewlett-Packard Model 8755A
Swept Amplitude Analyzer

Test Performed By: ____________________

Serial No. ____________________

Date: ____________________

	Lower Limit	Measured Value	Upper Limit
4-7. AMPLITUDE ACCURACY			
h. "A" Detector Input			
10 dB	9.1 dB	——	10.9 dB
20 dB	18.9 dB	——	21.1 dB
30 dB	28.9 dB	——	31.1 dB
40 dB	38.9 dB	——	41.1 dB
50 dB	48.9 dB	——	51.1 dB
60 dB	58.1 dB	——	61.9 dB
i. "B" Detector Input			
10 dB	9.1 dB	——	10.9 dB
20 dB	18.9 dB	——	21.1 dB
30 dB	28.9 dB	——	31.1 dB
40 dB	38.9 dB	——	41.1 dB
50 dB	48.9 dB	——	51.1 dB
60 dB	58.1 dB	——	61.9 dB
"R" Detector Input			
10 dB	9.1 dB	——	10.9 dB
20 dB	18.9 dB	——	21.1 dB
30 dB	28.9 dB	——	31.1 dB
40 dB	38.9 dB	——	41.1 dB
50 dB	48.9 dB	——	51.1 dB
60 dB	58.1 dB	——	61.9 dB
4-8. FREQUENCY RESPONSE			
f. & g. Trace Variation A/R Ratio:			
100 MHz to 8 GHz	−0.15 dB	——	+0.15 dB
100 MHz to 10 GHz	−0.2 dB	——	+0.2 dB
100 MHz to 12.4 GHz	−0.3 dB	——	+0.3 dB
100 MHz to 14 GHz	−0.45 dB	——	+0.45 dB
100 MHz to 15 GHz	−0.5 dB	——	+0.5 dB
100 MHz to 18 GHz	−0.6 dB	——	+0.6 dB
h. Trace Variation B/R Ratio:			
100 MHz to 8 GHz	−0.15 dB	——	+0.15 dB
100 MHz to 10 GHz	−0.2 dB	——	+0.2 dB
100 MHz to 12.4 GHz	−0.3 dB	——	+0.3 dB
100 MHz to 14 GHz	−0.45 dB	——	+0.45 dB
100 MHz to 15 GHz	−0.5 dB	——	+0.5 dB
100 MHz to 18 GHz	−0.6 dB	——	+0.6 dB

SECTION V
ADJUSTMENTS

5-1. INTRODUCTION

5-2. This section provides adjustment procedures for the Model 8755A Swept Amplitude Analyzer. Adjustments should be performed whenever the Model 8755A performance is out of tolerance. Allow 30 minutes warmup time before performing the adjustments. Adjustment locations are shown in Figure 5-1. Table 5-1 lists all of the adjustments and their functions.

5-3. EQUIPMENT REQUIRED

5-4. A list of equipment required to adjust the Swept Amplitude Analyzer is given in Figure 5-2 and also in Table 1-3.

5-5. RELATED ADJUSTMENTS

5-6. The adjustments should be performed in the order listed. However, if only one parameter is slightly out of tolerance, a single adjustment may be made. After any adjustment, the performance test in Section IV should be performed.

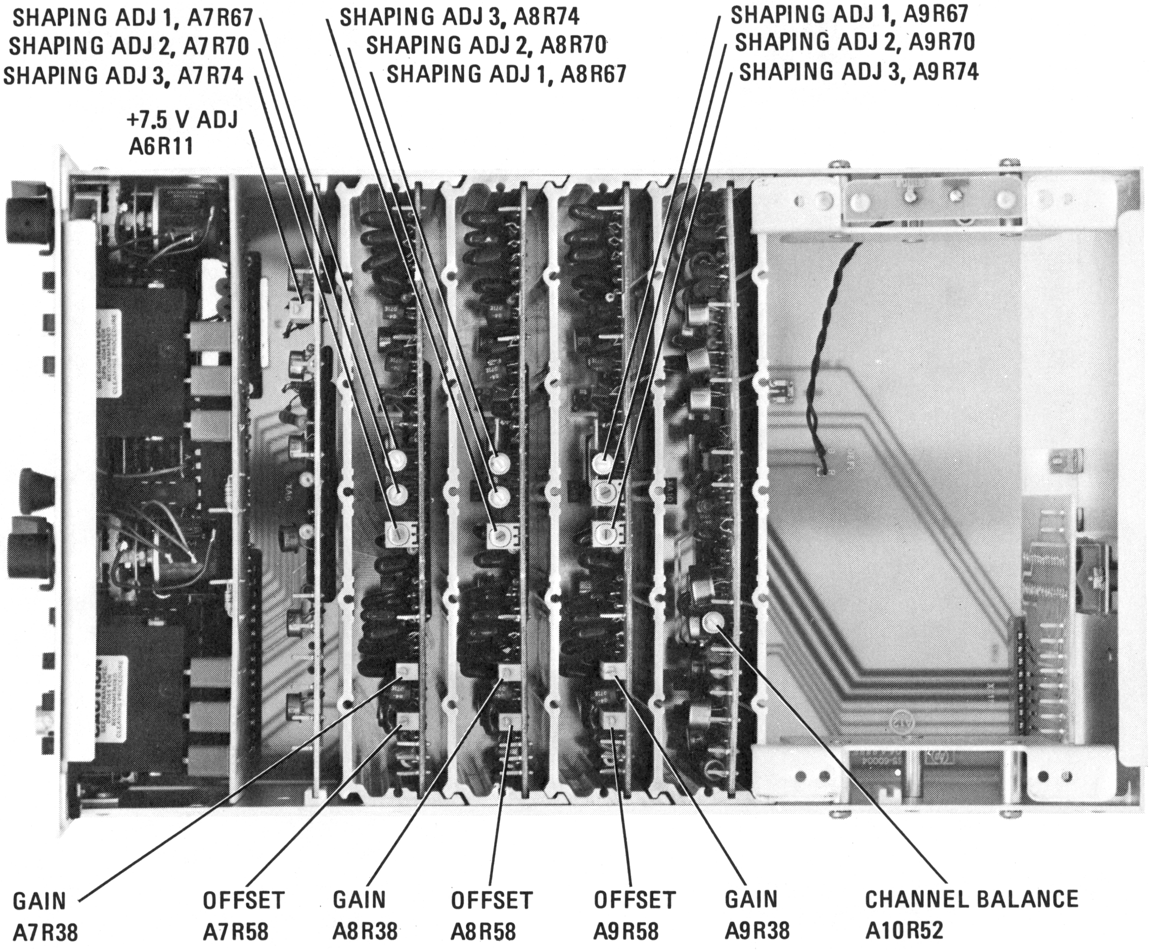
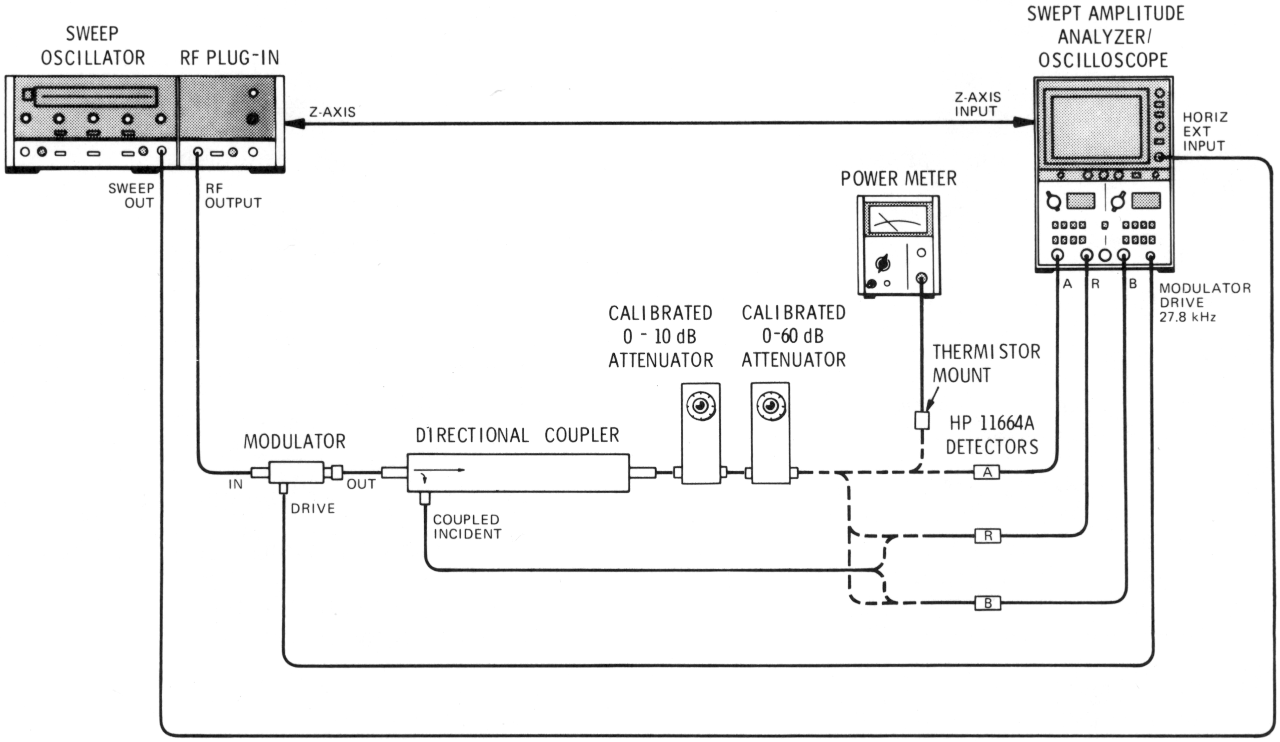

SHAPING ADJ 1, A7R67
SHAPING ADJ 2, A7R70
SHAPING ADJ 3, A7R74
+7.5 V ADJ
A6R11
SHAPING ADJ 3, A8R74
SHAPING ADJ 2, A8R70
SHAPING ADJ 1, A8R67
SHAPING ADJ 1, A9R67
SHAPING ADJ 2, A9R70
SHAPING ADJ 3, A9R74
GAIN
A7R38
OFFSET
A7R58
GAIN
A8R38
OFFSET
A8R58
OFFSET
A9R58
GAIN
A9R38
CHANNEL BALANCE
A10R52

Figure 5-1. Adjustment Locations

Table 5-1. Adjustment Controls

Control Reference Designator	Name	Function
A6R11	+7.5 V ADJ	Adjust + and — 7.5V power supplies
A7R38	GAIN	Adjusts overall gain of detector "A" log amplifier
A7R58	OFFSET	Adjusts the dc offset of detector "A" log amplifier output signal
A7R67	SHAPING ADJ 1	Adjusts detector "A" log amplifier log-to-linear conversion with intput range of zero dBm to +10 dBm
A7R70	SHAPING ADJ 2	Adjusts detector "A" log amplifier log-to-linear conversion with input range of —10 dBm to zero dBm
A7R74	SHAPING ADJ 3	Adjusts detector "A" log amplifier log-to-linear conversion with input range of —20 dBm to —10 dBm
A8R38	GAIN	Adjusts overall gain of detector "R" log amplifer
A8R58	OFFSET	Adjusts the dc offset of detector "R" log amplifier output signal
A8R67	SHAPING ADJ 1	Adjusts detector "R" log amplifier log-to-linear conversion with input range of zero dBm to +10 dBm
A8R70	SHAPING ADJ 2	Adjusts detector "R" log amplifier log-to-linear conversion with input range of —10 dBm to zero dBm
A8R74	SHAPING ADJ 3	Adjusts detector "R" log amplifier log-to-linear conversion with input ragne of —20 dBm to —10 dBm
A9R38	GAIN	Adjusts overall gain of detector "B" log amplifier
A9R58	OFFSET	Adjust the dc offset of detector "B" log amplifier output signal
A9R67	SHAPING ADJ 1	Adjusts detector "B" log amplifier log-to-linear conversion with input range of zero dBm to +10 dBm
A9R70	SHAPING ADJ 2	Adjusts detector "B" log amplifier log-to-linear conversion with input range of —10 dBm to zero dBm
A9R74	SHAPING ADJ 3	Adjusts detector "B" log amplifier log-to-linear conversion with input range of —20 dBm to —10 dBm
A10R52	CHANNEL BALANCE	Adjusts deflection balance between channel A and channel B


SWEEP OSCILLATOR
RF PLUG-IN
Z-AXIS
SWEEP OUT
RF OUTPUT
SWEPT AMPLITUDE ANALYZER/ OSCILLOSCOPE
Z-AXIS INPUT
HORIZ EXT INPUT
POWER METER
A
R
B
MODULATOR DRIVE 27.8 kHz
CALIBRATED 0 - 10 dB ATTENUATOR
CALIBRATED 0-60 dB ATTENUATOR
THERMISTOR MOUNT
HP 11664A DETECTORS
MODULATOR
DIRECTIONAL COUPLER
IN
OUT
DRIVE
COUPLED INCIDENT
A
R
B

EQUIPMENT:

Swept Amplitude Analyzer/Oscilloscope	HP 8755A/182A
Detectors (3 required)	HP 11664A
Modulator	HP 11665A/B
Sweep Oscillator	HP Model 8620 mainframe with: HP Model 8621B and 86330B + 86320A (0.1 to 4.2 GHz)
Directional Coupler	HP 778D
0-60 dB Step Attenuator (Calibrated)	HP 355D
Power Meter & Thermistor Mount	HP432A/8478B
10 dB Attenuator	HP 8491A, Opt. 010
3dB Attenuator	HP 8491A, Opt. 003

Figure 5-2. Log Amplifier Adjustment Test Setup

ADJUSTMENTS

5-7. ADJUSTMENT OF +7.5V SUPPLY

a. Check the +15V and —12.6V from the oscilloscope mainframe at the appropriate test points on the 8755A-A11 Rear Interconnect Assembly. If either of these voltages are greater than ±50 mV from their specified voltage, refer to the oscilloscope manual and adjust the voltage.

b. Connect digital voltmeter (DVM) to A6TP1 (+7.5V) and adjust A6R11 +7.5V ADJ control for +7.5 Vdc ± 5 mVdc.

c. Check the —7.5V supply at A6TP2. If the —7.5V is greater than ±100 mV, troubleshoot the —7.5V supply.

5-8. ADJUSTMENT OF A7, A8, AND A9 LOG AMPLIFIERS

Equipment Setup

a. Connect equipment as shown in Figure 5-2 with the power meter thermistor mount connected to the 0-60 dB attenuator.

b. Set the sweep oscillator for ΔF operation at 100 MHz center frequency with minimum sweep width.

c. Set the 0-10 dB attenuator to 10 dB and the 0-60 dB attenuator to 0 dB. Adjust the sweep oscillator RF output level for a —3 dBm power meter indication.

d. Disconnect the power meter from the 0-60 dB attenuator and connect the detectors as follows:

   1. When making the A7 (detector "A" logger) adjustments, connect the "R" detector to the coupled incident port of the directional coupler and the "A" detector to the 0-60 dB attenuator.

   2. When making the A8 (detector "R" logger) adjustments, connect the "A" detector to the coupled incident port of the directional coupler and the "R" detector to the 0-60 dB attenuator.

   3. When making the A9 (detector "B" logger) adjustments, connect the "R" detector to the coupled incident port of the directional coupler and the "B" detector to the 0-60 dB attenuator.

e. Press CHANNEL A DISPLAY POSITION pushbutton and adjust POSITION screwdriver adjustment to place the CRT trace on the center graticule line.

f. Press CHANNEL B DISPLAY POSITION pushbutton and adjust POSITION screwdriver adjustment to place the CRT trace on the center graticule line.

NOTE

All three 11664A detectors must be connected to the 8755A front panel even though only two detectors are being used.

g. Turn off the channel B display when adjusting detector "A" or "R" loggers. Turn off the channel A display when adjusting detector "B" logger. To turn off a display, push one DISPLAY pushbutton part part way in to "pop" all of the DISPLAY pushbuttons out.

NOTE

The equipment is set up for a ratio measurement when adjusting individual Log Amplifiers to reduce the effect of source match.

ADJUSTMENTS

5-8. ADJUSTMENT OF A7, A8, AND A9 LOG AMPLIFIERS (cont'd)

Logger Adjustment

h. Press the DISPLAY pushbuttons as follows:

  1. When adjusting detector "A" or "R" logger, press CHANNEL A DISPLAY A/R pushbutton.

  2. When adjusting detector "B" logger, press CHANNEL B DISPLAY B/R pushbutton.

i. Set the 0-60 dB attenuator to 50 dB and set the appropriate DISPLAY OFFSET switch to —50 dB.

j. Set the OFFSET CAL ON/OFF switch to ON and adjust the trace with the OFFSET CAL control to the center graticule line. Press .25 dB/DIV pushbutton and make fine adjustment. Readjust the OFFSET CAL control as necessary during the following adjustments to keep the amplitude response centered around the center graticule line.

NOTE

> It is advisable to cover the controls of the Log Amplifier Assemblies that are not being adjusted to avoid adjusting the wrong assembly.

k. Adjust the appropriate log amplifier internal GAIN and SHAPING controls to obtain the desired amplitude response. A response curve is shown in Figure 5-3 and Table 5-2 shows the adjustments. These are included as an aid in making these adjustments. Course adjustments should be made first and then finer adjustments made until the amplitude response is within ±0.5 dB (± the tolerance of the calibrated attenuators) over the detector input range of +10 dBm to —50 dBm.

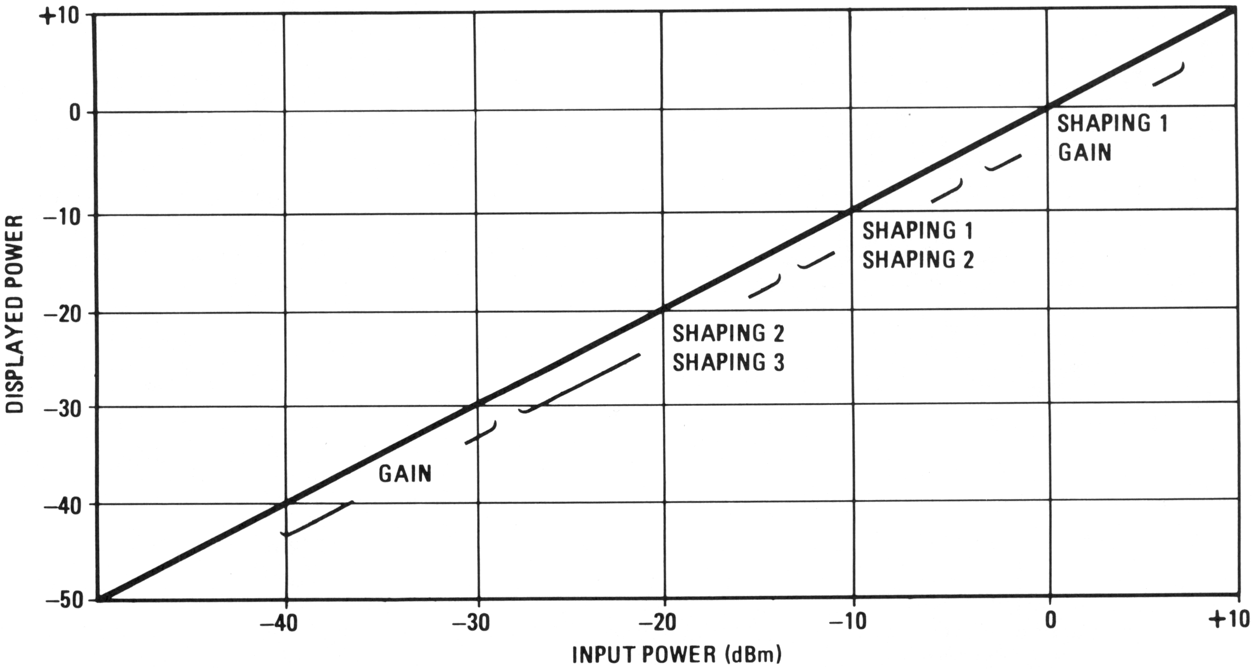


Figure 5-3. Graph for Log Amplifier Adjustment

5-8. ADJUSTMENT OF A7, A8, AND A9 LOG AMPLIFIERS (cont'd)

Table 5-2. Control Settings for Log Amplifier Adjustment

Control Settings			Controls Adjusted to Bring the Trace to Within ±0.4 dB of the Center Graticule Line	
0-60 dB Attenuator	**0-10 dB Attenuator**	**8755A OFFSET dB**		
50	10	—50	OFFSET CAL	
40	10	—40	Gain	Adjust for Compromise
30	10	—30	Gain	
20	10	—20	Shaping 3 and Shaping 2 if necessary	
10	10	—10	Shaping 2 and Shaping 1 if necessary	
0	10	00	Shaping 1 and Gain if necessary	
0	0	+10	Shaping 1 and Gain if necessary	

Absolute Power Adjustment

l. Select the 0-10 dB attenuator, 0-60 dB attenuator, and OFFSET dB switch setting combination in Table 5-2 that places the CRT trace closest to the center graticule line.

m. Set the OFFSET CAL ON/OFF switch to OFF and adjust the log amplifier assembly OFFSET control to return the trace to the center graticule line.

n. Repeat the above procedure to adjust the remaining two log amplifier assemblies.

5-9. CHANNEL BALANCE

a. Connect equipment as shown in Figure 5-2 with "R" detector connected to 0-60 dB attenuator.

b. Adjust sweep oscillator for 100 MHz, ΔF mode, and narrowest sweep band possible.

c. Set both CHANNEL A and B OFFSET CAL ON/OFF switches to OFF, OFFSET dB switches to —20 dB, press 10 dB/DIV pushbuttons, and press DISPLAY POSITION pushbuttons.

d. Adjust POSITION screwdriver adjustments to place the channel A and B CRT traces on the center graticule line superimposed on one another.

e. Press both CHANNEL A and B DISPLAY R pushbuttons and adjust the sweep oscillator POWER LEVEL control to place the channel B CRT trace on the graticule line two divisions above the center line.

f. Set CHANNEL A OFFSET CAL ON/OFF switch to ON and adjust channel A trace so that it is superimposed on channel B trace.

g. Change the polarity of both CHANNEL A and B OFFSET dB switches to + and the CRT traces should move down approximately four divisions (40 dB) and be superimposed on one another. If they are not superimposed, adjust A10 CHANNEL BALANCE, A10R52. If the traces did not move exactly four divisions, adjust the front panel GAIN screwdriver adjustment to calibrate for 10 dB/DIV.

SECTION VI
REPLACEABLE PARTS

6-1. INTRODUCTION

6-2. This section contains information for ordering parts. Table 6-1 lists abbreviations used in the parts list and throughout the manual. Table 6-2 lists all replaceable parts in reference designator order. Table 6-3 gives all the manufacturer's code numbers that are used in the parts list.

6-3. ABBREVIATIONS

6-4. Table 6-1 gives a list of abbreviations used in the parts list, schematics, and throughout the manual. In some cases, two forms of the abbreviation are used, one all capital letters, and one partial or no capitals. This occurs because the abbreviations in the parts list are always all capitals, since the computer readout does not print lower case letters. However, in the schematics and other parts of the manual, other abbreviation forms are used with both lower case and upper case letters.

6-5. REPLACEABLE PARTS LIST

6-6. Table 6-2 is the list of replaceable parts and is organized as follows:

a. Electrical assemblies and their components in alpha-numerical order by reference designation.

b. Chassis-mounted parts in alpha-numeric order by reference designation.

c. Miscellaneous parts.

d. Illustrated parts breakdown, if appropriate.

The information given for each part consists of the following:

a. The Hewlett-Packard part number.

b. The total quantity (Qty) in the instrument.

c. The description of the part.

d. The typical manufacturer of the part in a five-digit code.

e. Manufacturer code number for the part.

The total quantity for each part is given only once - at the first appearance of the part number in the list.

6-7. ORDERING INSTRUCTIONS

6-8. To order a part listed in the replaceable parts table, quote the Hewlett-Packard part number, indicate quantity required, and address the order to the nearest Hewlett-Packard office.

6-9. To order a part that is not listed in the replaceable parts table, include the instrument model number, instrument serial number, the description and function of the part, and the number of parts required. Address the order to the nearest Hewlett-Packard office.

Table 6-1. Reference Designations and Abbreviations

REFERENCE DESIGNATIONS

A	assembly
AT	attenuator; isolator; termination
B	fan; motor
BT	battery
C	capacitor
CP	coupler
CR	diode; diode thyristor; varactor
DC	directional coupler
DL	delay line
DS	annunciator; signaling device (audible or visual); lamp; LED
E	miscellaneous electrical part
F	fuse
FL	filter
H	hardware
HY	circulator
J	electrical connector (stationary portion); jack
K	relay
L	coil; inductor
M	meter
MP	miscellaneous mechanical part
P	electrical connector (movable portion); plug
Q	transistor: SCR; triode thyristor
R	resistor
RT	thermistor
S	switch
T	transformer
TB	terminal board
TC	thermocouple
TP	test point
U	integrated circuit; microcircuit
V	electron tube
VR	voltage regulator; breakdown diode
W	cable; transmission path; wire
X	socket
Y	crystal unit (piezo-electric or quartz)
Z	tuned cavity; tuned circuit

ABBREVIATIONS

A	ampere
ac	alternating current
ACCESS	accessory
ADJ	adjustment
A/D	analog-to-digital
AF	audio frequency
AFC	automatic frequency control
AGC	automatic gain control
AL	aluminum
ALC	automatic level control
AM	amplitude modulation
AMPL	amplifier
APC	automatic phase control
ASSY	assembly
AUX	auxiliary
avg	average
AWG	American wire gauge
BAL	balance
BCD	binary coded decimal
BD	board
BE CU	beryllium copper
BFO	beat frequency oscillator
BH	binder head
BKDN	breakdown
BP	bandpass
BPF	bandpass filter
BRS	brass
BWO	backward-wave oscillator
CAL	calibrate
ccw	counter-clockwise
CER	ceramic
CHAN	channel
cm	centimeter
CMO	cabinet mount only
COAX	coaxial
COEF	coefficient
COM	common
COMP	composition
COMPL	complete
CONN	connector
CP	cadmium plate
CRT	cathode-ray tube
CTL	complementary transistor logic
CW	continuous wave
cw	clockwise
cm	centimeter
D/A	digital-to-analog
dB	decibel
dBm	decibel referred to 1 mW
dc	direct current
deg	degree (temperature interval or difference)
°	degree (plane angle)
°C	degree Celsius (centigrade)
°F	degree Fahrenheit
°K	degree Kelvin
DEPC	deposited carbon
DET	detector
diam	diameter
DIA	diameter (used in parts list)
DIFF AMPL	differential amplifier
div	division
DPDT	double-pole, double-throw
DR	drive
DSB	double sideband
DTL	diode transistor logic
DVM	digital voltmeter
ECL	emitter coupled logic
EMF	electromotive force
EDP	electronic data processing
ELECT	electrolytic
ENCAP	encapsulated
EXT	external
F	farad
FET	field-effect transistor
F/F	flip-flop
FH	flat head
FIL H	fillister head
FM	frequency modulation
FP	front panel
FREQ	frequency
FXD	fixed
g	gram
GE	germanium
GHz	gigahertz
GL	glass
GRD	ground(ed)
H	henry
h	hour
HET	heterodyne
HEX	hexagonal
HD	head
HDW	hardware
HF	high frequency
HG	mercury
HI	high
HP	Hewlett-Packard
HPF	high pass filter
HR	hour (used in parts list)
HV	high voltage
Hz	Hertz
IC	integrated circuit
ID	inside diameter
IF	intermediate frequency
IMPG	impregnated
in	inch
INCD	incandescent
INCL	include(s)
INP	input
INS	insulation
INT	internal
kg	kilogram
kHz	kilohertz
kΩ	kilohm
kV	kilovolt
lb	pound
LC	inductance-capacitance
LED	light-emitting diode
LF	low frequency
LG	long
LH	left hand
LIM	limit
LIN	linear taper (used in parts list)
lin	linear
LK WASH	lock washer
LO	low; local oscillator
LOG	logrithmic taper (used in parts list)
log	logrithm(ic)
LPF	low pass filter
LV	low voltage
m	meter (distance)
mA	milliampere
MAX	maximum
MΩ	megohm
MEG	meg (10^6) (used in parts list)
MET FLM	metal film
MET OX	metallic oxide
MF	medium frequency; microfarad (used in parts list)
MFR	manufacturer
mg	milligram
MHz	megahertz
mH	millihenry
mho	mho
MIN	minimum
min	minute (time)
′	minute (plane angle)
MINAT	minature
mm	millimeter

NOTE

All abbreviations in the parts list will be in upper-case.

Table 6-1. Reference Designations and Abbreviations (cont'd)

MOD	modulator
MOM	momentary
MOS	metal-oxide semiconductor
ms	millisecond
MTG	mounting
MTR	meter (indicating device)
mV	millivolt
mVac	millivolt, ac
mVdc	millivolt, dc
mVpk	millivolt, peak
mVp-p	millivolt, peak-to-peak
mVrms	millivolt, rms
mW	milliwatt
MUX	multiplex
MY	mylar
μA	microampere
μF	microfarad
μH	microhenry
μmho	micromho
μs	microsecond
μV	microvolt
μVac	microvolt, ac
μVdc	microvolt, dc
μVpk	microvolt, peak
μVp-p	microvolt, peak-to-peak
μVrms	microvolt, rms
μW	microwatt
nA	nanoampere
NC	no connection
N/C	normally closed
NE	neon
NEG	negative
nF	nanofarad
NI PL	nickel plate
N/O	normally open
NOM	nominal
NORM	normal
NPN	negative-positive-negative
NPO	negative-positive zero (zero temperature coefficient)
NRFR	not recommended for field replacement
NSR	not separately replaceable
ns	nanosecond
nW	nanowatt
OBD	order by description
OD	outside diameter
OH	oval head
OP AMPL	operational amplifier
OPT	option
OSC	oscillator
OX	oxide
oz	ounce
Ω	ohm
P	peak (used in parts list)
PAM	pulse-amplitude modulation
PC	printed circuit
PCM	pulse-code modulation; pulse-count modulation
PDM	pulse-duration modulation
pF	picofarad
PH BRZ	phosphor bronze
PHL	Phillips
PIN	positive-intrinsic-negative
PIV	peak inverse voltage
pk	peak
PL	phase lock
PLO	phase lock oscillator
PM	phase modulation
PNP	positive-negative-positive
P/O	part of
POLY	polystyrene
PORC	porcelain
POS	positive; position(s) (used in parts list)
POSN	position
POT	potentiometer
p-p	peak-to-peak
PP	peak-to-peak (used in parts list)
PPM	pulse-position modulation
PREAMPL	preamplifier
PRF	pulse-repetition frequency
PRR	pulse repetition rate
ps	picosecond
PT	point
PTM	pulse-time modulation
PWM	pulse-width modulation
PWV	peak working voltage
RC	resistance-capacitance
RECT	rectifier
REF	reference
REG	regulated
REPL	replaceable
RF	radio frequency
RFI	radio frequency interference
RH	round head; right hand
RLC	resistance-inductance-capacitance
RMO	rack mount only
rms	root-mean-square
RND	round
ROM	read-only memory
R&P	rack and panel
RWV	reverse working voltage
S	scattering parameter
s	second (time)
..."	second (plane angle)
S-B	slow-blow (fuse) (used in parts list)
SCR	silicon controlled rectifier; screw
SE	selenium
SECT	sections
SEMICON	semiconductor
SHF	superhigh frequency
SI	silicon
SIL	silver
SL	slide
SNR	signal-to-noise ratio
SPDT	single-pole, double-throw
SPG	spring
SR	split ring
SPST	single-pole, single-throw
SSB	single sideband
SST	stainless steel
STL	steel
SQ	square
SWR	standing-wave ratio
SYNC	synchronize
T	timed (slow-blow fuse)
TA	tantalum
TC	temperature compensating
TD	time delay
TERM	terminal
TFT	thin-film transistor
TGL	toggle
THD	thread
THRU	through
TI	titanium
TOL	tolerance
TRIM	trimmer
TSTR	transistor
TTL	transistor-transistor logic
TV	television
TVI	television interference
TWT	traveling wave tube
U	micro (10^{-6}) (used in parts list)
UF	microfarad (used in parts list)
UHF	ultrahigh frequency
UNREG	unregulated
V	volt
VA	voltampere
Vac	volts, ac
VAR	variable
VCO	voltage-controlled oscillator
Vdc	volts, dc
VDCW	volts, dc, working (used in parts list)
V(F)	volts, filtered
VFO	variable-frequency oscillator
VHF	very-high frequency
Vpk	volts, peak
Vp-p	volts, peak-to-peak
Vrms	volts, rms
VSWR	voltage standing wave ratio
VTO	voltage-tuned oscillator
VTVM	vacuum-tube voltmeter
V(X)	volts, switched
W	watt
W/	with
WIV	working inverse voltage
WW	wirewound
W/O	without
YIG	yttrium-iron-garnet
Z_o	characteristic impedance

NOTE

All abbreviations in the parts list will be in upper-case.

MULTIPLIERS

Abbreviation	Prefix	Multiple
T	tera	10^{12}
G	giga	10^{9}
M	mega	10^{6}
k	kilo	10^{3}
da	deka	10
d	deci	10^{-1}
c	centi	10^{-2}
m	milli	10^{-3}
μ	micro	10^{-6}
n	nano	10^{-9}
p	pico	10^{-12}
f	femto	10^{-15}
a	atto	10^{-18}

Table 6-2. Replaceable Parts

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
A1	3100-3051	2	SWITCH:MINIATURE THUMB WHEEL	28480	3100-3051
A2	3100-3051		SWITCH:MINIATURE THUMB WHEEL	28480	3100-3051
A3	08755-60006	1	BOARD ASSY:DB/DIV SWITCH	28480	08755-60006
A3C1	0180-0374	4	C:FXD TANT. 10 UF 10% 20VDCW	56289	150D106X9020B2-DYS
A3C2	0180-0374		C:FXD TANT. 10 UF 10% 20VDCW	56289	150D106X9020B2-DYS
A3C3	0180-0374		C:FXD TANT. 10 UF 10% 20VDCW	56289	150D106X9020B2-DYS
A3C4	0180-0374		C:FXD TANT. 10 UF 10% 20VDCW	56289	150D106X9020B2-DYS
A3R1	0698-7799	10	R:FXD FLM 2K OHM 0.25% 1/8W	28480	0698-7799
A3R2	0698-7799		R:FXD FLM 2K OHM 0.25% 1/8W	28480	0698-7799
A3R3	0698-8172	2	R:FXD FLM 4K OHM 0.25% 1/8W	28480	0698-8172
A3R4	0698-8172		R:FXD FLM 4K OHM 0.25% 1/8W	28480	0698-8172
A3R5	0698-3194	2	R:FXD FLM 20K OHM 0.25% 1/8W	28480	0698-3194
A3R6	0698-3194		R:FXD FLM 20K OHM 0.25% 1/8W	28480	0698-3194
A3R7	0698-3201	2	R:FXD FLM 80.0K OHM 1% 1/8W	28480	0698-3201
A3R8	0698-3201		R:FXD FLM 80.0K OHM 1% 1/8W	28480	0698-3201
A3S1	3101-1659	4	SWITCH:PUSHBUTTON 4 STA. 1.0A 300 VAC	28480	3101-1659
A3S2	3101-1659		SWITCH:PUSHBUTTON 4 STA. 1.0A 300 VAC	28480	3101-1659
A3S3	3101-1658	1	SWITCH:PUSHBUTTON DPDT 1.0A 300V	28480	3101-1658
A4	08755-60007	1	BOARD ASSY:DISPLAY	28480	08755-60007
A4CR1	1910-0016	8	DIODE:GERMANIUM 100MA/0.85V 60PIV	93332	D2361
A4CR2	1910-0016		DIODE:GERMANIUM 100MA/0.85V 60PIV	93332	D2361
A4CR3	1910-0016		DIODE:GERMANIUM 100MA/0.85V 60PIV	93332	D2361
A4CR4	1910-0016		DIODE:GERMANIUM 100MA/0.85V 60PIV	93332	D2361
A4CR5	1910-0016		DIODE:GERMANIUM 100MA/0.85V 60PIV	93332	D2361
A4CR6	1910-0016		DIODE:GERMANIUM 100MA/0.85V 60PIV	93332	D2361
A4CR7	1910-0016		DIODE:GERMANIUM 100MA/0.85V 60PIV	93332	D2361
A4CR8	1910-0016		DIODE:GERMANIUM 100MA/0.85V 60PIV	93332	D2361
A4R1	0698-7799		R:FXD FLM 2K OHM 0.25% 1/8W	28480	0698-7799
A4R2	0757-0401	28	R:FXD MET FLM 100 OHM 1% 1/8W	28480	0757-0401
A4R3	0698-7799		R:FXD FLM 2K OHM 0.25% 1/8W	28480	0698-7799
A4R4	0698-7799		R:FXD FLM 2K OHM 0.25% 1/8W	28480	0698-7799
A4R5	0698-7799		R:FXD FLM 2K OHM 0.25% 1/8W	28480	0698-7799
A4R6	0757-0401		R:FXD MET FLM 100 OHM 1% 1/8W	28480	0757-0401
A4S1	3101-1659		SWITCH:PUSHBUTTON 4 STA. 1.0A 300 VAC	28480	3101-1659
A4S2	3101-1659		SWITCH:PUSHBUTTON 4 STA. 1.0A 300 VAC	28480	3101-1659
A5	08755-60005	1	BOARD ASSY:FRONT INTERCONNECT	28480	08755-60005
A5C1	0180-0197	47	C:FXD ELECT 2.2 UF 10% 20VDCW	56289	150D225X9020A2-DYS
A5C2	0180-0197		C:FXD ELECT 2.2 UF 10% 20VDCW	56289	150D225X9020A2-DYS
A5C3	0180-0197		C:FXD ELECT 2.2 UF 10% 20VDCW	56289	150D225X9020A2-DYS
A5C4	0180-0197		C:FXD ELECT 2.2 UF 10% 20VDCW	56289	150D225X9020A2-DYS
A5C5	0180-0197		C:FXD ELECT 2.2 UF 10% 20VDCW	56289	150D225X9020A2-DYS
A5C6	0180-0197		C:FXD ELECT 2.2 UF 10% 20VDCW	56289	150D225X9020A2-DYS
A5L1	9100-1664	12	COIL/CHOKE 3000 UH 5%	28480	9100-1664
A5L2	9100-1664		COIL/CHOKE 3000 UH 5%	28480	9100-1664
A5L3	9100-1664		COIL/CHOKE 3000 UH 5%	28480	9100-1664
A5L4	9100-1664		COIL/CHOKE 3000 UH 5%	28480	9100-1664
A5L5	9100-1664		COIL/CHOKE 3000 UH 5%	28480	9100-1664
A5L6	9100-1664		COIL/CHOKE 3000 UH 5%	28480	9100-1664
A5L7	9100-1664		COIL/CHOKE 3000 UH 5%	28480	9100-1664
A5L8	9100-1664		COIL/CHOKE 3000 UH 5%	28480	9100-1664
A5L9	9100-1664		COIL/CHOKE 3000 UH 5%	28480	9100-1664
A5L10	9100-1664		COIL/CHOKE 3000 UH 5%	28480	9100-1664
A5L11	9100-1664		COIL/CHOKE 3000 UH 5%	28480	9100-1664
A5L12	9100-1664		COIL/CHOKE 3000 UH 5%	28480	9100-1664
A5R1	0757-0440	7	R:FXD MET FLM 7.50K OHM 1% 1/8W	28480	0757-0440
A5R2	0757-0440		R:FXD MET FLM 7.50K OHM 1% 1/8W	28480	0757-0440
A5R3	0698-6614	4	R:FXD FLM 7.5K OHM 0.1% 1/8W	28480	0698-6614
A5R4	0698-6614		R:FXD FLM 7.5K OHM 0.1% 1/8W	28480	0698-6614
A5R5	0698-3236	2	R:FXD FLM 15K OHM 0.25% 1/8W	28480	0698-3236
A5R6	0698-3236		R:FXD FLM 15K OHM 0.25% 1/8W	28480	0698-3236
A5R7	0698-3221	2	R:FXD FLM 30K OHM 0.25% 1/8W	28480	0698-3221
A5R8	0698-3221		R:FXD FLM 30K OHM 0.25% 1/8W	28480	0698-3221
A5R9	0698-8173	2	R:FXD FLM 37.5K OHM 0.25% 1/8W	28480	0698-8173
A5R10	0698-8173		R:FXD FLM 37.5K OHM 0.25% 1/8W	28480	0698-8173
A5R11	0698-8174	2	R:FXD FLM 75K OHM 0.5% 1/8W	28480	0698-8174
A5R12	0698-8174		R:FXD FLM 75K OHM 0.5% 1/8W	28480	0698-8174
A5R13	0698-3234	2	R:FXD FLM 150K OHM 0.25% 1/8W	28480	0698-3234
A5R14	0698-3234		R:FXD FLM 150K OHM 0.25% 1/8W	28480	0698-3234
A5R15	0698-3219	2	R:FXD FLM 300K OHM 0.25% 1/8W	28480	0698-3219
A5R16	0698-3219		R:FXD FLM 300K OHM 0.25% 1/8W	28480	0698-3219
A5R17	2100-3186	3	R:VAR COMP 2.5K OHM 10% LIN 1/2W (CHANNEL A POSITION)	28480	2100-3186
A5R18	0757-0280	9	R:FXD MET FLM 1K OHM 1% 1/8W	28480	0757-0280
A5R19	0757-0420	10	R:FXD MET FLM 750 OHM 1% 1/8W	28480	0757-0420
A5R20	2100-3186		R:VAR COMP 2.5K OHM 10% LIN 1/2W (CHANNEL B POSITION)	28480	2100-3186

Table 6-2. Replaceable Parts

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
A5R21	0757-0280		R:FXD MET FLM 1K OHM 1% 1/8W	28480	0757-0280
A5R22	0757-0420		R:FXD MET FLM 750 OHM 1% 1/8W	28480	0757-0420
A5R23	2100-3186		R:VAR COMP 2.5K OHM 10% LIN 1/2W (GAIN)	28480	2100-3186
A5XA1 A	1251-1941	6	CONNECTOR:PC EDGE 1 ROW 6 CONTACT	71785	252-06-30-310
A5XA1 B	1251-1941		CONNECTOR:PC EDGE 1 ROW 6 CONTACT	71785	252-06-30-310
A5XA1 C	1251-1941		CONNECTOR:PC EDGE 1 ROW 6 CONTACT	71785	252-06-30-310
A5XA2 A	1251-1941		CONNECTOR:PC EDGE 1 ROW 6 CONTACT	71785	252-06-30-310
A5XA2 B	1251-1941		CONNECTOR:PC EDGE 1 ROW 6 CONTACT	71785	252-06-30-310
A5XA2 C	1251-1941		CONNECTOR:PC EDGE 1 ROW 6 CONTACT	71785	252-06-30-310
A5XA3	1251-0213	4	CONNECTOR:PC EDGE 15 CONTACT	95354	91-6915-1700-00
A5XA4	1251-2034	2	CONNECTOR:PC EDGE (2 X 10) 20 CONTACT	71785	252-10-30-300
A6	08755-60002	1	BOARD ASSY:PROCESSOR	28480	08755-60002
A6C1 THRU A6C4	0180-0116	4	C:FXD ELECT 6.8 UF 10% 35VDCW	56289	150D685X9035B2-DYS
A6C5	0160-2207	1	C:FXD 300 PF +-5% 300WVDC	28480	0160-2207
A6C6	0160-2199	1	C:FXD 30 PF +-5% 300WVDC	28480	0160-2199
A6CR1 THRU A6CR4	1902-0048	4	DIODE:BREAKDOWN 6.81V 5%	04713	SZ10939-134
A6CR5	1902-0761	1	DIODE, TC REF 6.2V	04713	1N821
A6Q1	1853-0020	11	TSTR:SI PNP(SELECTED FROM 2N3702)	28480	1853-0020
A6Q2	1854-0071	28	TSTR:SI NPN(SELECTED FROM 2N3704)	28480	1854-0071
A6R1	0698-7799		R:FXD FLM 2K OHM 0.25% 1/8W	28480	0698-7799
A6R2	0698-7799		R:FXD FLM 2K OHM 0.25% 1/8W	28480	0698-7799
A6R3	0698-7799		R:FXD FLM 2K OHM 0.25% 1/8W	28480	0698-7799
A6R4	0698-7799		R:FXD FLM 2K OHM 0.25% 1/8W	28480	0698-7799
A6R5	0757-0401		R:FXD MET FLM 100 OHM 1% 1/8W	28480	0757-0401
A6R6	0757-0401		R:FXD MET FLM 100 OHM 1% 1/8W	28480	0757-0401
A6R7	0757-0401		R:FXD MET FLM 100 OHM 1% 1/8W	28480	0757-0401
A6R8	0757-0401		R:FXD MET FLM 100 OHM 1% 1/8W	28480	0757-0401
A6R9	0757-0280		R:FXD MET FLM 1K OHM 1% 1/8W	28480	0757-0280
A6R10	0757-0401		R:FXD MET FLM 100 OHM 1% 1/8W	28480	0757-0401
A6R11	2100-3095	1	R:VAR CERMET 200 OHM 10% TYPE P 3/4W	28480	2100-3095
A6R12	0698-6614		R:FXD FLM 7.5K OHM 0.1% 1/8W	28480	0698-6614
A6R13	0698-6614		R:FXD FLM 7.5K OHM 0.1% 1/8W	28480	0698-6614
A6R14	0757-1090	1	R:FXD MET FLM 261 OHM 1% 1/2W	28480	0757-1090
A6R15	0698-0083	6	R:FXD MET FLM 1.96K OHM 1% 1/8W	28480	0698-0083
A6R16	0757-0802	1	R:FXD MET FLM 162 OHM 1% 1/2W	28480	0757-0802
A6R17	0698-0083		R:FXD MET FLM 1.96K OHM 1% 1/8W	28480	0698-0083
A6R18	0757-0280		R:FXD MET FLM 1 K OHM 1% 1/8W	28480	0757-0280
A6U1	1820-0223	11	INTEGRATED CIRCUIT:OPERATIONAL AMPL.	28480	1820-0223
A6U2	1820-0223		INTEGRATED CIRCUIT:OPERATIONAL AMPL.	28480	1820-0223
A6U3	1826-0013	10	IC:LINEAR	28480	1826-0013
A6U4	1826-0013		IC:LINEAR	28480	1826-0013
A6U5	1826-0013		IC:LINEAR	28480	1826-0013
A6U6	1826-0013		IC:LINEAR	28480	1826-0013
A7	08755-60001	3	BOARD ASSY:27.8 KHZ LOG AMPLIFIER	28480	08755-60001
A7C1	0180-0197		C:FXD ELECT 2.2 UF 10% 20VDCW	56289	150D225X9020A2-DYS
A7C2	0160-0127	15	C:FXD CER 1.0 UF 20% 25VDCW	56289	5C13CS-CML
A7C3	0160-0127		C:FXD CER 1.0 UF 20% 25VDCW	56289	5C13CS-CML
A7C4	0180-1746	9	C:FXD ELECT 15 UF 10% 20VDCW	28480	0180-1746
A7C5	0180-1746		C:FXD ELECT 15 UF 10% 20VDCW	28480	0180-1746
A7C6	0180-0197		C:FXD ELECT 2.2 UF 10% 20VDCW	56289	150D225X9020A2-DYS
A7C7	0180-0197		C:FXD ELECT 2.2 UF 10% 20VDCW	56289	150D225X9020A2-DYS
A7C8	0160-3292	6	C:FXD MICA 1300 PF 1% 100 V	28480	0160-3292
A7C9	0160-3292		C:FXD MICA 1300 PF 1% 100 V	28480	0160-3292
A7C10	0160-3047	6	C:FXD MICA 3280 PF 1% 100VDCW	28480	0160-3047
A7C11	0160-3047		C:FXD MICA 3280 PF 1% 100VDCW	28480	0160-3047
A7C12	0140-0221	6	C:FXD MICA 220 PF 1%	28480	0140-0221
A7C13	0140-0221		C:FXD MICA 220 PF 1%	28480	0140-0221
A7C14	0180-0197		C:FXD ELECT 2.2 UF 10% 20VDCW	56289	150D225X9020A2-DYS
A7C15	0160-0218	18	C:FXD MICA 2400PF 1% 300V	14655	RDM20F242F3C
A7C16	0160-0218		C:FXD MICA 2400PF 1% 300V	14655	RDM20F242F3C
A7C17	0160-0218		C:FXD MICA 2400PF 1% 300V	14655	RDM20F242F3C
A7C18	0160-0218		C:FXD MICA 2400PF 1% 300V	14655	RDM20F242F3C
A7C19	0160-0218		C:FXD MICA 2400PF 1% 300V	14655	RDM20F242F3C
A7C20	0160-0218		C:FXD MICA 2400PF 1% 300V	14655	RDM20F242F3C
A7C21	0180-2206	9	C:FXD ELECT 60 UF 10% 6VDCW	56289	150D606X9006B2
A7C22	0180-0197		C:FXD ELECT 2.2 UF 10% 20VDCW	56289	150D225X9020A2-DYS
A7C23	0180-0197		C:FXD ELECT 2.2 UF 10% 20VDCW	56289	150D225X9020A2-DYS
A7C24	0180-0197		C:FXD ELECT 2.2 UF 10% 20VDCW	56289	150D225X9020A2-DYS
A7C25	0180-0197		C:FXD ELECT 2.2 UF 10% 20VDCW	56289	150D225X9020A2-DYS
A7C26	0160-0127		C:FXD CER 1.0 UF 20% 25VDCW	56289	5C13CS-CML
A7C27	0160-2055	3	C:FXD CER 0.01 UF +80-20% 100VDCW	56289	C023F101F103ZS22-CDH

See introduction to this section for ordering information

Table 6-2. Replaceable Parts

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
A7C28	0180-0197		C:FXD ELECT 2.2 UF 10% 20VDCW	56289	150D225X9020A2-DYS
A7C29	0160-0127		C:FXD CER 1.0 UF 20% 25VDCW	56289	5C13CS-CML
A7C30	0160-0127		C:FXD CER 1.0 UF 20% 25VDCW	56289	5C13CS-CML
A7C31	0160-2261	3	C:FXD CER 15 PF 5% 500VDCW	72982	301-NPO-15 PF
A7C32	0140-0196	7	C:FXD MICA 150 PF 5%	72136	RDM15F151J3C
A7C33	0140-0192	3	C:FXD MICA 68 PF 5%	28480	0140-0192
A7C34	0180-0197		C:FXD ELECT 2.2 UF 10% 20VDCW	56289	150D225X9020A2-DYS
A7C35	0180-2206		C:FXD ELECT 60 UF 10% 6VDCW	56289	150D606X9006B2
A7C36	0180-2206		C:FXD ELECT 60 UF 10% 6VDCW	56289	150D606X9006B2
A7C37	0180-0197		C:FXD ELECT 2.2 UF 10% 20VDCW	56289	150D225X9020A2-DYS
A7C38	0160-3456	3	C:FXD CER 1000 PF 10% 250VDCW	56289	C067F251F102KS22-CDH
A7C39	0140-0196		C:FXD MICA 150 PF 5%	72136	RDM15F151J3C
A7C40	0180-0197		C:FXD ELECT 2.2 UF 10% 20VDCW	56289	150D225X9020A2-DYS
A7C41	0180-1743	3	C:FXD ELECT 0.1 UF 10% 35VDCW	56289	150D104X9035A2-DYS
A7C42	0140-0235	9	C:FXD MICA 2250PF 1% 300VDCW	14655	RDM20F(2250QF3C
A7C43	0140-0235		C:FXD MICA 2250PF 1% 300VDCW	14655	RDM20F(2250QF3C
A7C44	0140-0235		C:FXD MICA 2250PF 1% 300VDCW	14655	RDM20F(2250QF3C
A7C45	0180-0197		C:FXD ELECT 2.2 UF 10% 20VDCW	56289	150D225X9020A2-DYS
A7C46	0160-2199	3	C:FXD MICA 30 PF 5% 300VDCW	28480	0160-2199
A7CR1	1901-0040	29	DIODE:SILICON 30MA 30WV	07263	FDG1088
A7CR2	1901-0040		DIODE:SILICON 30MA 30WV	07263	FDG1088
A7CR3	1901-0040		DIODE:SILICON 30MA 30WV	07263	FDG1088
A7CR4	1901-0040		DIODE:SILICON 30MA 30WV	07263	FDG1088
A7CR5	1901-0040		DIODE:SILICON 30MA 30WV	07263	FDG1088
A7CR6	1901-0040		DIODE:SILICON 30MA 30WV	07263	FDG1088
A7CR7	1901-0040		DIODE:SILICON 30MA 30WV	07263	FDG1088
A7CR8	1901-0040		DIODE:SILICON 30MA 30WV	07263	FDG1088
A7CR9	1902-0551	3	DIODE BREAKDOWN:6.19V 5%	28480	1902-0551
A7L1	9140-0210	9	COIL/CHOKE 100 UH 5%	82142	15-1315-12J
A7L2	9140-0210		COIL/CHOKE 100 UH 5%	82142	15-1315-12J
A7L3	9100-2578	3	INDUCTOR:SHIELDED 2700 UH 10%	82142	15S-272K
A7L4	9140-0210		COIL/CHOKE 100 UH 5%	82142	15-1315-12J
A7Q1	1854-0019	4	TSTR:SI NPN	28480	1854-0019
A7Q2	1853-0007	6	TSTR:SI PNP	80131	2N3251
A7Q3	1854-0071		TSTR:SI NPN(SELECTED FROM 2N3704)	28480	1854-0071
A7Q4	1854-0071		TSTR:SI NPN(SELECTED FROM 2N3704)	28480	1854-0071
A7Q5	1854-0071		TSTR:SI NPN(SELECTED FROM 2N3704)	28480	1854-0071
A7Q6	1853-0020		TSTR:SI PNP(SELECTED FROM 2N3702)	28480	1853-0020
A7Q7	1854-0071		TSTR:SI NPN(SELECTED FROM 2N3704)	28480	1854-0071
A7Q8	1853-0020		TSTR:SI PNP(SELECTED FROM 2N3702)	28480	1853-0020
A7Q9	1854-0404	3	TSTR:SI NPN	28480	1854-0404
A7Q10	1853-0007		TSTR:SI PNP	80131	2N3251
A7Q11	1854-0071		TSTR:SI NPN(SELECTED FROM 2N3704)	28480	1854-0071
A7Q12	1854-0071		TSTR:SI NPN(SELECTED FROM 2N3704)	28480	1854-0071
A7Q13	1853-0020		TSTR:SI PNP(SELECTED FROM 2N3702)	28480	1853-0020
A7R1	0698-3456	3	R:FXD MET FLM 287K OHM 1% 1/8W	28480	0698-3456
A7R2	0698-3450	13	R:FXD MET FLM 42.2K OHM 1% 1/8W	28480	0698-3450
A7R3	0757-0467	3	R:FXD MET FLM 121K OHM 1% 1/8W	28480	0757-0467
A7R4	0698-3450		R:FXD MET FLM 42.2K OHM 1% 1/8W	28480	0698-3450
A7R5	0698-3441	6	R:FXD MET FLM 215 OHM 1% 1/8W	28480	0698-3441
A7R6	0757-0200	6	R:FXD MET FLM 5.62K OHM 1% 1/8W	28480	0757-0200
A7R7	0698-0085	3	R:FXD MET FLM 2.61K OHM 1% 1/8W	28480	0698-0085
A7R8	0698-3441		R:FXD MET FLM 215 OHM 1% 1/8W	28480	0698-3441
A7R9	0698-3437	6	R:FXD MET FLM 133 OHM 1% 1/8W	28480	0698-3437
A7R10	0698-3151	21	R:FXD MET FLM 2.87K OHM 1% 1/8W	28480	0698-3151
A7R11	0698-0084	13	R:FXD MET FLM 2.15K OHM 1% 1/8W	28480	0698-0084
A7R12	0698-3154	9	R:FXD MET FLM 4.22K OHM 1% 1/8W	28480	0698-3154
A7R13	0698-3437		R:FXD MET FLM 133 OHM 1% 1/8W	28480	0698-3437
A7R14	0698-3447	11	R:FXD MET FLM 422 OHM 1% 1/8W	28480	0698-3447
A7R15	0698-3151		R:FXD MET FLM 2.87K OHM 1% 1/8W	28480	0698-3151
A7R16	0698-3151		R:FXD MET FLM 2.87K OHM 1% 1/8W	28480	0698-3151
A7R17	0698-3151		R:FXD MET FLM 2.87K OHM 1% 1/8W	28480	0698-3151
A7R18	0698-3151		R:FXD MET FLM 2.87K OHM 1% 1/8W	28480	0698-3151
A7R19	0757-0274	12	R:FXD MET FLM 1.21K OHM 1% 1/8W	28480	0757-0274
A7R20	0698-3151		R:FXD MET FLM 2.87K OHM 1% 1/8W	28480	0698-3151
A7R21	0698-3154		R:FXD MET FLM 4.22K OHM 1% 1/8W	28480	0698-3154
A7R22	0698-3158	3	R:FXD MET FLM 23.7K OHM 1% 1/8W	28480	0698-3158
A7R23	0757-0200		R:FXD MET FLM 5.62K OHM 1% 1/8W	28480	0757-0200
A7R24	0698-3152	9	R:FXD MET FLM 3.48K OHM 1% 1/8W	28480	0698-3152
A7R25	0698-3154		R:FXD MET FLM 4.22K OHM 1% 1/8W	28480	0698-3154
A7R26	0757-0274		R:FXD MET FLM 1.21K OHM 1% 1/8W	28480	0757-0274
A7R27	0698-3152		R:FXD MET FLM 3.48K OHM 1% 1/8W	28480	0698-3152
A7R28	0757-0199	15	R:FXD MET FLM 21.5K OHM 1% 1/8W	28480	0757-0199
A7R29	0757-0274		R:FXD MET FLM 1.21K OHM 1% 1/8W	28480	0757-0274
A7R30	0757-0199		R:FXD MET FLM 21.5K OHM 1% 1/8W	28480	0757-0199
A7R31	0757-0394	15	R:FXD MET FLM 51.1 OHM 1% 1/8W	28480	0757-0394

Table 6-2. Replaceable Parts

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
A7R32	0757-0279	7	R:FXD MET FLM 3.16K OHM 1% 1/8W	28480	0757-0279
A7R33	0757-0394		R:FXD MET FLM 51.1 OHM 1% 1/8W	28480	0757-0394
A7R34	0698-0084		R:FXD MET FLM 2.15K OHM 1% 1/8W	28480	0698-0084
A7R35	0757-0401		R:FXD MET FLM 100 OHM 1% 1/8W	28480	0757-0401
A7R36	0757-0401		R:FXD MET FLM 100 OHM 1% 1/8W	28480	0757-0401
A7R37	0757-0420		R:FXD MET FLM 750 OHM 1% 1/8W	28480	0757-0420
A7R38	2100-3123	3	R:VAR CERMET 500 OHM 10% TYPE P 3/4W	28480	2100-3123
A7R39	0757-0420		R:FXD MET FLM 750 OHM 1% 1/8W	28480	0757-0420
A7R40	0698-0084		R:FXD MET FLM 2.15K OHM 1% 1/8W	28480	0698-0084
A7R41	0757-0401		R:FXD MET FLM 100 OHM 1% 1/8W	28480	0757-0401
A7R42	0757-0442	26	R:FXD MET FLM 10.0K OHM 1% 1/8W	28480	0757-0442
A7R43	0757-0199		R:FXD MET FLM 21.5K OHM 1% 1/8W	28480	0757-0199
A7R44	0757-0394		R:FXD MET FLM 51.1 OHM 1% 1/8W	28480	0757-0394
A7R45	0757-0401		R:FXD MET FLM 100 OHM 1% 1/8W	28480	0757-0401
A7R46	0757-0316	3	R:FXD MET FLM 42.2 OHM 1% 1/8W	28480	0757-0316
A7R47	0757-0401		R:FXD MET FLM 100 OHM 1% 1/8W	28480	0757-0401
A7R48	0757-0442		R:FXD MET FLM 10.0K OHM 1% 1/8W	28480	0757-0442
A7R49	0757-0442		R:FXD MET FLM 10.0K OHM 1% 1/8W	28480	0757-0442
A7R50	0698-0083		R:FXD MET FLM 1.96K OHM 1% 1/8W	28480	0698-0083
A7R51	0757-0274		R:FXD MET FLM 1.21K OHM 1% 1/8W	28480	0757-0274
A7R52	0698-3155	3	R:FXD MET FLM 4.64K OHM 1% 1/8W	28480	0698-3155
A7R53	0757-0199		R:FXD MET FLM 21.5K OHM 1% 1/8W	28480	0757-0199
A7R54	0757-0442		R:FXD MET FLM 10.0K OHM 1% 1/8W	28480	0757-0442
A7R55	0757-0394		R:FXD MET FLM 51.1 OHM 1% 1/8W	28480	0757-0394
A7R56	0757-0394		R:FXD MET FLM 51.1 OHM 1% 1/8W	28480	0757-0394
A7R57	0698-3243	3	R:FXD MET FLM 178K OHM 1% 1/8W	28480	0698-3243
A7R58	2100-3054	3	R:VAR CERMET 50K OHM 10% 3/4W	28480	2100-3054
A7R59	0757-0442		R:FXD MET FLM 10.0K OHM 1% 1/8W	28480	0757-0442
A7R60	0757-0401		R:FXD MET FLM 100 OHM 1% 1/8W	28480	0757-0401
A7R61	0757-0440		R:FXD MET FLM 7.50K OHM 1% 1/8W	28480	0757-0440
A7R62	0757-0199		R:FXD MET FLM 21.5K OHM 1% 1/8W	28480	0757-0199
A7R63	0757-0346	3	R:FXD MET FLM 10 OHM 1% 1/8W	28480	0757-0346
A7R64	0698-0084		R:FXD MET FLM 2.15K OHM 1% 1/8W	28480	0698-0084
A7R65	0757-0442		R:FXD MET FLM 10.0K OHM 1% 1/8W	28480	0757-0442
A7R66	0757-0428	4	R:FXD MET FLM 1.62K OHM 1% 1/8W	28480	0757-0428
A7R67	2100-2521	3	R:VAR FLM 2000 OHM 10% LIN 1/2W	28480	2100-2521
A7R68	0757-0442		R:FXD MET FLM 10.0K OHM 1% 1/8W	28480	0757-0442
A7R69	0698-3152		R:FXD MET FLM 3.48K OHM 1% 1/8W	28480	0698-3152
A7R70	2100-2489	4	R:VAR FLM 5K OHM 10% LIN 1/2W	28480	2100-2489
A7R71	0698-3450		R:FXD MET FLM 42.2K OHM 1% 1/8W	28480	0698-3450
A7R72	0698-3151		R:FXD MET FLM 2.87K OHM 1% 1/8W	28480	0698-3151
A7R73	0757-0442		R:FXD MET FLM 10.0K OHM 1% 1/8W	28480	0757-0442
A7R74	2100-2514	3	R:VAR CERMET 20K OHM 10% LIN 1/2W	28480	2100-2514
A7R75	0698-3450		R:FXD MET FLM 42.2K OHM 1% 1/8W	28480	0698-3450
A7U1	1813-0001	3	IC	28480	1813-0001
A7U2	1820-0223		INTEGRATED CIRCUIT:OPERATIONAL AMPL.	28480	1820-0223
A7U3	1820-0223		INTEGRATED CIRCUIT:OPERATIONAL AMPL.	28480	1820-0223
A7U4	1820-0223		INTEGRATED CIRCUIT:OPERATIONAL AMPL.	28480	1820-0223
A7U5	1826-0013		IC:LINEAR	28480	1826-0013
A7U6	1826-0013		IC:LINEAR	28480	1826-0013
A7XU1	1200-0462	24	SOCKET:IC CONTACT	00779	3-116141-2
A8			SAME AS A7, USE PREFIX A8		
A9			SAME AS A7, USE PREFIX A9		
A10	08755-60003	1	BOARD ASSY:MODULATOR DRIVER	28480	08755-60003
A10C1	0160-2387	1	C:FXD MICA 1000 PF 1% 500VDCW	00853	RDM19E102F5S
A10C2	0160-2206	1	C:FXD MICA 160 PF 5%	28480	0160-2206
A10C3	0180-1746		C:FXD ELECT 15 UF 10% 20VDCW	28480	0180-1746
A10C4	0180-1746		C:FXD ELECT 15 UF 10% 20VDCW	28480	0180-1746
A10C5	0180-1746		C:FXD ELECT 15 UF 10% 20VDCW	28480	0180-1746
A10C6	0160-2221	1	C:FXD MICA 1300 PF 5%	28480	0160-2221
A10C7	0180-0197		C:FXD ELECT 2.2 UF 10% 20VDCW	56289	150D225X9020A2-DYS
A10C8	0140-0196		C:FXD MICA 150 PF 5%	72136	RDM15F151J3C
A10C9	0180-0058	4	C:FXD AL ELECT 50 UF +75-10% 25VDCW	56289	30D506G025CC2-DSM
A10C10	0180-0058		C:FXD AL ELECT 50 UF +75-10% 25VDCW	56289	30D506G025CC2-DSM
A10C11	0180-0058		C:FXD AL ELECT 50 UF +75-10% 25VDCW	56289	30D506G025CC2-DSM
A10C12	0180-0058		C:FXD AL ELECT 50 UF +75-10% 25VDCW	56289	30D506G025CC2-DSM
A10C13	0140-0198	1	C:FXD MICA 200 PF 5%	72136	RDM15F201J3C
A10C14	0160-2201	1	C:FXD MICA 51 PF 5%	72136	RDM15E510J1C
A10C15	0180-0269	1	C:FXD ELECT 1.0 UF +50-10% 150VDCW	56289	30D105F150BA2-DSM
A10C16	0180-0197		C:FXD ELECT 2.2 UF 10% 20VDCW	56289	150D225X9020A2-DYS
A10CR1	1902-0579	1	DIODE BREAKDOWN:5.11V	28480	1902-0579
A10CR2	1901-0040		DIODE:SILICON 30MA 30WV	07263	FDG1088
A10CR3	1901-0040		DIODE:SILICON 30MA 30WV	07263	FDG1088
A10CR4	1901-0040		DIODE:SILICON 30MA 30WV	07263	FDG1088

See introduction to this section for ordering information

Table 6-2. Replaceable Parts

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
A10CR5	1901-0040		DIODE:SILICON 30MA 30WV	07263	FDG1088
A10CR6	1901-0040		DIODE:SILICON 30MA 30WV	07263	FDG1088
A10CR7	1910-0022	1	DIODE:GE 5WIV	14433	G401
A10L1	9140-0137	2	COIL:FXD RF 1000 UH 5%	28480	9140-0137
A10L2	9100-1654	1	COIL/CHOKE 1100 UH 5%	99800	2500-30
A10L3	9140-0137		COIL:FXD RF 1000 UH 5%	28480	9140-0137
A10L4	9100-1648	1	COIL/CHOKE 560 UH 5%	82142	19-1331-29J
A10L5	9100-1666	4	COIL/CHOKE:FXD 3600 UH 5%	28480	9100-1666
A10L6	9100-1666		COIL/CHOKE:FXD 3600 UH 5%	28480	9100-1666
A10L7	9100-1666		COIL/CHOKE:FXD 3600 UH 5%	28480	9100-1666
A10L8	9100-1666		COIL/CHOKE:FXD 3600 UH 5%	28480	9100-1666
A10Q1	1854-0019		TSTR:SI NPN	28480	1854-0019
A10Q2	1854-0071		TSTR:SI NPN(SELECTED FROM 2N3704)	28480	1854-0071
A10Q3	1854-0071		TSTR:SI NPN(SELECTED FROM 2N3704)	28480	1854-0071
A10Q4	1854-0232	4	TSTR:SI NPN(SELECTED FROM 2N3440)	28480	1854-0232
A10Q5	1854-0232		TSTR:SI NPN(SELECTED FROM 2N3440)	28480	1854-0232
A10Q6	1854-0039	2	TSTR:SI NPN	80131	2N3053
A10Q7	1853-0001	1	TSTR:SI PNP(SELECTED FROM 2N1132)	28480	1853-0001
A10Q8	1854-0039		TSTR:SI NPN	80131	2N3053
A10Q9	1853-0020		TSTR:SI PNP(SELECTED FROM 2N3702)	28480	1853-0020
A10Q10	1854-0071		TSTR:SI NPN(SELECTED FROM 2N3704)	28480	1854-0071
A10Q11	1854-0232		TSTR:SI NPN(SELECTED FROM 2N3440)	28480	1854-0232
A10Q12	1854-0232		TSTR:SI NPN(SELECTED FROM 2N3440)	28480	1854-0232
A10Q13	1854-0071		TSTR:SI NPN(SELECTED FROM 2N3704)	28480	1854-0071
A10Q14	1854-0221	2	TSTR:SI NPN(REPL.BY 2N4044)	28480	1854-0221
A10Q15	1854-0221		TSTR:SI NPN(REPL.BY 2N4044)	28480	1854-0221
A10Q16	1854-0071		TSTR:SI NPN(SELECTED FROM 2N3704)	28480	1854-0071
A10Q17	1854-0071		TSTR:SI NPN(SELECTED FROM 2N3704)	28480	1854-0071
A10Q18	1854-0071		TSTR:SI NPN(SELECTED FROM 2N3704)	28480	1854-0071
A10Q19	1854-0071		TSTR:SI NPN(SELECTED FROM 2N3704)	28480	1854-0071
A10Q20	1854-0071		TSTR:SI NPN(SELECTED FROM 2N3704)	28480	1854-0071
A10R1	0757-0279		R:FXD MET FLM 3.16K OHM 1% 1/8W	28480	0757-0279
A10R2	0698-3268	2	R:FXD FLM 11.5K OHM 1% 1/8W	28480	0698-3268
A10R3	0698-3620	1	R:FXD MET OX 100 OHM 5% 2W	28480	0698-3620
A10R4	0698-0084		R:FXD MET FLM 2.15K OHM 1% 1/8W	28480	0698-0084
A10R5	0698-3268		R:FXD FLM 11.5K OHM 1% 1/8W	28480	0698-3268
A10R6	0757-0280		R:FXD MET FLM 1K OHM 1% 1/8W	28480	0757-0280
A10R7	0757-0444	1	R:FXD MET FLM 12.1K OHM 1% 1/8W	28480	0757-0444
A10R8	0698-3157	2	R:FXD MET FLM 19.6K OHM 1% 1/8W	28480	0698-3157
A10R9	0757-0280		R:FXD MET FLM 1K OHM 1% 1/8W	28480	0757-0280
A10R10	0757-0280		R:FXD MET FLM 1K OHM 1% 1/8W	28480	0757-0280
A10R11	0757-0280		R:FXD MET FLM 1K OHM 1% 1/8W	28480	0757-0280
A10R12	0757-0440		R:FXD MET FLM 7.50K OHM 1% 1/8W	28480	0757-0440
A10R13	0757-0442		R:FXD MET FLM 10.0K OHM 1% 1/8W	28480	0757-0442
A10R14	0757-0280		R:FXD MET FLM 1K OHM 1% 1/8W	28480	0757-0280
A10R15	0757-0438	2	R:FXD MET FLM 5.11K OHM 1% 1/8W	28480	0757-0438
A10R16	0698-3450		R:FXD MET FLM 42.2K OHM 1% 1/8W	28480	0698-3450
A10R17	0757-0159	1	R:FXD MET FLM 1000 OHM 1% 1/2W	28480	0757-0159
A10R18	0757-0401		R:FXD MET FLM 100 OHM 1% 1/8W	28480	0757-0401
A10R19	0757-0401		R:FXD MET FLM 100 OHM 1% 1/8W	28480	0757-0401
A10R20	0757-0795	4	R:FXD MET FLM 75 OHM 1% 1/2W	28480	0757-0795
A10R21	0757-0795		R:FXD MET FLM 75 OHM 1% 1/2W	28480	0757-0795
A10R22	0757-0795		R:FXD MET FLM 75 OHM 1% 1/2W	28480	0757-0795
A10R23	0757-0795		R:FXD MET FLM 75 OHM 1% 1/2W	28480	0757-0795
A10R24	0757-0317	1	R:FXD MET FLM 1.33K OHM 1% 1/8W	28480	0757-0317
A10R25	0757-0416	1	R:FXD MET FLM 511 OHM 1% 1/8W	28480	0757-0416
A10R26	0757-0428		R:FXD MET FLM 1.62K OHM 1% 1/8W	28480	0757-0428
A10R27	0698-0083		R:FXD MET FLM 1.96K OHM 1% 1/8W	28480	0698-0083
A10R28	0757-0422	1	R:FXD MET FLM 909 OHM 1% 1/8W	28480	0757-0422
A10R29	0698-3447		R:FXD MET FLM 422 OHM 1% 1/8W	28480	0698-3447
A10R30	0757-0465	2	R:FXD MET FLM 100K OHM 1% 1/8W	28480	0757-0465
A10R31	0757-0447	2	R:FXD MET FLM 16.2K OHM 1% 1/8W	28480	0757-0447
A10R32	0698-3447		R:FXD MET FLM 422 OHM 1% 1/8W	28480	0698-3447
A10R33	0757-0420		R:FXD MET FLM 750 OHM 1% 1/8W	28480	0757-0420
A10R34	0757-1094	1	R:FXD MET FLM 1.47K OHM 1% 1/8W	28480	0757-1094
A10R35	0757-0438		R:FXD MET FLM 5.11K OHM 1% 1/8W	28480	0757-0438
A10R36	0757-0440		R:FXD MET FLM 7.50K OHM 1% 1/8W	28480	0757-0440
A10R37	0698-0082	2	R:FXD MET FLM 464 OHM 1% 1/8W	28480	0698-0082
A10R38	0757-0279		R:FXD MET FLM 3.16K OHM 1% 1/8W	28480	0757-0279
A10R39	0757-0421	2	R:FXD MET FLM 825 OHM 1% 1/8W	28480	0757-0421
A10R40	0698-3348	3	R:FXD MET FLM 4.64K OHM 1% 1/2W	28480	0698-3348
A10R41	0698-3447		R:FXD MET FLM 422 OHM 1% 1/8W	28480	0698-3447
A10R42	0698-3445	2	R:FXD MET FLM 348 OHM 1% 1/8W	28480	0698-3445
A10R43	0757-0442		R:FXD MET FLM 10.0K OHM 1% 1/8W	28480	0757-0442
A10R44	0757-0465		R:FXD MET FLM 100K OHM 1% 1/8W	28480	0757-0465

See introduction to this section for ordering information

Table 6-2. Replaceable Parts

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
A10R45	0698-3348		R:FXD MET FLM 4.64K OHM 1% 1/2W	28480	0698-3348
A10R46	0698-3348		R:FXD MET FLM 4.64K OHM 1% 1/2W	28480	0698-3348
A10R47	0698-3447		R:FXD MET FLM 422 OHM 1% 1/8W	28480	0698-3447
A10R48	0698-3445		R:FXD MET FLM 348 OHM 1% 1/8W	28480	0698-3445
A10R49	0698-3157		R:FXD MET FLM 19.6K OHM 1% 1/8W	28480	0698-3157
A10R50	0757-0279		R:FXD MET FLM 3.16K OHM 1% 1/8W	28480	0757-0279
A10R51	0757-0421		R:FXD MET FLM 825 OHM 1% 1/8W	28480	0757-0421
A10R52	2100-2489		R:VAR FLM 5K OHM 10% LIN 1/2W	28480	2100-2489
A10R53	0698-0082		R:FXD MET FLM 464 OHM 1% 1/8W	28480	0698-0082
A10R54	0757-0279		R:FXD MET FLM 3.16K OHM 1% 1/8W	28480	0757-0279
A10R55	0757-0401		R:FXD MET FLM 100 OHM 1% 1/8W	28480	0757-0401
A10R56	0698-3447		R:FXD MET FLM 422 OHM 1% 1/8W	28480	0698-3447
A10R57	0698-3447		R:FXD MET FLM 422 OHM 1% 1/8W	28480	0698-3447
A10R58	0757-0447		R:FXD MET FLM 16.2K OHM 1% 1/8W	28480	0757-0447
A10R59	0757-0420		R:FXD MET FLM 750 OHM 1% 1/8W	28480	0757-0420
A10R60	0757-0278	1	R:FXD MET FLM 1.78K OHM 1% 1/8W	28480	0757-0278
A10R61	0757-0280		R:FXD MET FLM 1K OHM 1% 1/8W	28480	0757-0280
A10R62	0698-3150	1	R:FXD MET FLM 2.37K OHM 1% 1/8W	28480	0698-3150
A10R63	0698-3161	1	R:FXD MET FLM 38.3K OHM 1% 1/8W	28480	0698-3161
A10R64	0698-3447		R:FXD MET FLM 422 OHM 1% 1/8W	28480	0698-3447
A10R65	0698-3447		R:FXD MET FLM 422 OHM 1% 1/8W	28480	0698-3447
A10U1	1820-0077	1	IC:TTL DUAL D F/F	01295	SN7474N
A10U2	1820-0269	1	IC:TTL QUAD 2-INPT NAND GATE	01295	SN7403N
A10U3	1826-0081	1	IC:LINEAR OPERATIONAL AMPLIFIER	12040	LM318H
A11	08755-60008	1	BOARD ASSY:REAR INTERCONNECT	28480	08755-60008
A11P1	1251-0136	1	CONNECTOR:32 PIN MALE	02660	26-4100-32P
A12	08755-60004	1	BOARD ASSY:MASTER	28480	08755-60004
A12J1	1250-0836	4	CONNECTOR:RF SUB-MINIATURE	98291	50-053-0000
A12J2	1250-0836		CONNECTOR:RF SUB-MINIATURE	98291	50-053-0000
A12J3	1250-0836		CONNECTOR:RF SUB-MINIATURE	98291	50-053-0000
A12J4	1250-0836		CONNECTOR:RF SUB-MINIATURE	98291	50-053-0000
A12MP1	0380-0745	3	STANDOFF:SWAGE TYPE 0.187" LG 6-32 THD	00000	OBD
A12MP2	0380-0745		STANDOFF:SWAGE TYPE 0.187" LG 6-32 THD	00000	OBD
A12MP3	0380-0745		STANDOFF:SWAGE TYPE 0.187" LG 6-32 THD	00000	OBD
A12XA5	1251-2035	3	CONNECTOR:PC EDGE (2 X 15) 30 CONTACT	71785	252-15-30-300
A12XA6	1251-2035		CONNECTOR:PC EDGE (2 X 15) 30 CONTACT	71785	252-15-30-300
A12XA7	1251-0213		CONNECTOR:PC EDGE 15 CONTACT	95354	91-6915-1700-00
A12XA8	1251-0213		CONNECTOR:PC EDGE 15 CONTACT	95354	91-6915-1700-00
A12XA9	1251-0213		CONNECTOR:PC EDGE 15 CONTACT	95354	91-6915-1700-00
A12XA10	1251-2035		CONNECTOR:PC EDGE (2 X 15) 30 CONTACT	71785	252-15-30-300
A12XA11	1251-2034		CONNECTOR:PC EDGE (2 X 10) 20 CONTACT	71785	252-10-30-300
			CHASSIS PARTS		
J1	1251-1864	3	SOCKET:5 FEMALE CONTACTS (DETECTOR CABLE A)	82389	61HA5F
J2	1251-1864		SOCKET:5 FEMALE CONTACTS (DETECTOR CABLE R)	82389	61HA5F
J3	1251-1864		SOCKET:5 FEMALE CONTACTS (DETECTOR CABLE B)	82389	61HA5F
J4	1250-0118	1	CONNECTOR:BNC (MODULATOR DRIVE)	24931	28JR 128-1
	5040-0702	2	INSULATOR:CONNECTOR	28480	5040-0702
J5	1251-0198	1	CONNECTOR:PC EDGE (2 X 6) 12 CONTACT	71785	251-06-30-261
P1	08755-00007	1	DEFLECTION OUTPUT CONNECTOR	28480	08755-00007
R1	2100-3192	2	R:VAR COMP 5K OHM 20 TURN (CHANNEL A OFFSET CAL) ORDER REPLACEMENT KIT, 08755-60019	28480	2100-3192
R2	2100-3192		R:VAR COMP 5K OHM 20 TURN (CHANNEL B OFFSET CAL) ORDER REPLACEMENT KIT, 08755-60019	28480	2100-3192
S1	3100-3057	2	SWITCH:ROTARY (CHANNEL A OFFSET CAL, ON/OFF) ORDER REPLACEMENT KIT, 08755-60019	28480	3100-3057
S2	3100-3057		SWITCH:ROTARY (CHANNEL B OFFSET CAL, ON/OFF) ORDER REPLACEMENT KIT, 08755-60019	28480	3100-3057
W1	08755-60015	1	CABLE ASSY:YELLOW	28480	08755-60015
W2	08755-60016	1	CABLE ASSY:RED	28480	08755-60016
W3	08755-60017	1	CABLE ASSY:BLUE	28480	08755-60017
W4	08755-60018	1	CABLE ASSY:WHITE	28480	08755-60018
			MISCELLANEOUS		
	0370-0432	2	KNOB:BLACK LEVER (OFFSET CAL)	28480	0370-0432
	0370-0450	17	KNOB:PUSHBUTTON SWITCH, BLK	71590	J52305
	0370-0451	17	BEZEL:PUSHBUTTON KNOB BLK NYLON	28480	0370-0451
	0510-0160	2	NUT:HEX 4-40 THREAD	95987	N440-X

Table 6-2. Replaceable Parts

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
	0590-0043	3	NUT:HEX 1/4 X 32 INTERNAL THREAD	00866	OBD
	1400-0053	2	CLAMP:LOOP CABLE (FRONT PANEL)	95987	3/16-4
	1400-0866	1	CLAMP:CABLE (MASTER BOARD)	00000	OBD
	1480-0004	1	PIN:SPRING	00000	OBD
	1480-0209	1	PIN:SPRING 0.094" DIA TYPE 302	00287	094-0250-M-D
	1490-0848	3	BUSHING:POT 1/4-32 EXT THREAD(CAL) (POSITION AND GAIN)	00000	OBD
	2190-0369	2	WASHER:FLAT,NYLON 0.253" ID FOR #12 HDW	00000	OBD
	3050-0159	1	WASHER:NYLON #6	80120	OBD
	7120-2359	1	PLATE:SERIAL(SER OPT)	28480	7120-2359
	00180-05002	3	LEVER:HORIZONTAL POSITION (OFFSET CAL)	28480	00180-05002
	00220-67403	2	KNOB (OFFSET CAL)	28480	00220-67403
	01815-05001	1	PAWL:LATCH	28480	01815-05001
	01815-09101	1	SPRING:LATCH	28480	01815-09101
	01815-21202	1	SUPPORT:BOTTOM	28480	01815-21202
	01815-22301	1	YOKE	28480	01815-22301
	01815-23101	1	RETAINER:YOKE	28480	01815-23101
	01815-23701	1	SHAFT:LATCH	28480	01815-23701
	01815-67410	1	KNOB:LATCH	28480	01815-67410
	08755-20011	2	NUT:KNURLED (OFFSET CAL)	28480	08755-20011

See introduction to this section for ordering information

Table 6-2. Replaceable Parts

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
			CABINET PARTS		
	08755-00001	1	PANEL:FRONT	28480	08755-00001
	08755-00002	1	PANEL:SUB	28480	08755-00002
	08755-00003	1	PANEL:REAR	28480	08755-00003
	08755-00004	2	PANEL:SIDE	28480	08755-00004
	08755-00005	1	GUIDE	28480	08755-00005
	08755-00006	1	COVER	28480	08755-00006
	08755-00008	4	NUT:PLATE	28480	08755-00008
	08755-20009	4	MODULE SECTION	28480	08755-20009
	08755-20010	1	MODULE:END	28480	08755-20010

See introduction to this section for ordering information

Table 6-3. Code List of Manufacturers

MFR NO.	MANUFACTURER NAME	ADDRESS	ZIP CODE
00000	U.S.A. COMMON	ANY SUPPLIER OF U.S.A.	
00287	CEMCO	DANIELSON, CONN.	06239
00779	AMP INC.(AIRCRAFT MARINE PROD.)	HARRISBURG, PA.	17101
00853	SANGAMO ELECTRIC CO.PICKENS DIV.	PICKENS, S.C.	29671
00866	GOE ENGINEERING CO. INC.	CITY OF INDUSTRY, CALIF.	91746
01295	TEXAS INSTRUMENTS INC. SEMICONDUCTOR COMPONENTS DIV.	DALLAS, TEX.	75231
02660	AMPHENOL CORP.	BROADVIEW, ILL.	60153
04713	MOTOROLA SEMICONDUCTOR PROD.INC.	PHOENIX, ARIZ.	85008
07263	FAIRCHILD CAMERA & INST. CORP. SEMICONDUCTOR DIV.	MOUNTAIN VIEW, CALIF.	94040
12040	NATIONAL SEMICONDUCTOR CORP.	DANBURY, CONN.	06810
14433	ITT SEMICONDUCTOR DIV. ITT CORP.	W. PALM BEACH, FLA.	33401
14655	CORNELL DUBLIER ELECT. DIV.FEDERAL PACIFIC ELECT. CO.	NEWARK, N.J.	07105
24931	SPECIALTY CONNECTOR CO. INC.	INDIANAPOLIS, IND.	46227
28480	HEWLETT-PACKARD CO. CORPORATE HQ	YOUR NEAREST HP OFFICE	
56289	SPRAGUE ELECTRIC CO.	N. ADAMS, MASS.	01247
71590	GLOBE UNION INC. CENTRALAB DIV.	MILWAUKEE, WISC.	53201
71785	CINCH MFG. CO. DIV TRW INC.	ELK GROVE VILLAGE, ILL.	
72136	ELECTRO MOTIVE MFG. CO. INC.	WILLIMANTIC, CONN.	06226
72982	ERIE TECHNOLOGICAL PROD. INC.	ERIE, PA.	16512
80120	SCHNITZER ALLOY PROD. CO.	ELIZABETH N.J.	07206
80131	ELECTRONIC INDUSTRIES ASSOCIATION	WASHINGTON D.C.	20006
82142	AIRCO SPEER ELECT. COMP.	DU BOIS, PA.	15801
82389	SWITCHCRAFT INC.	CHICAGO, ILL.	60630
93332	SYLVANIA ELECTRIC PROD. INC. SEMICONDUCTOR DIV.	WOBURN, MASS.	01801
95354	METHODE MFG. CO.	ROLLING MEADOWS, ILL.	60008
95987	WECKESSER CO. INC.	CHICAGO, ILL.	60641
98291	SEALECTRO CORP.	MAMARONECK, N.Y.	10544
99800	DELEVAN ELECTRONICS CORP.	E. AURORA, N.Y.	14052

See introduction to this section for ordering information

SECTION VII
MANUAL CHANGES

7-1. INTRODUCTION

7-2. This section normally contains information for adapting this manual to instruments for which the content does not apply directly. Since this manual does apply directly to instruments having serial numbers listed on the title page, no change information is given here. Refer to INSTRUMENTS COVERED BY MANUAL in Section I for additional important information about serial number coverage.

SECTION VIII
SERVICE

8-1. INTRODUCTION

8-2. This section provides instructions for testing, troubleshooting, and repairing the Model 8755A Swept Amplitude Analyzer.

8-3. PRINCIPLES OF OPERATION

8-4. Detailed circuit description for each individual schematic diagram is placed on the facing left-hand foldout page. This places material needed for printed-circuit level diagnosis in one location and allows easy correlation between function and specific circuit.

8-5. TROUBLESHOOTING

8-6. Troubleshooting is generally divided into two maintenance levels in this manual. The first is the assembly level, which isolates the cause of a malfunction to a circuit or assembly. A troubleshooting flow diagram provides a simple step-by-step procedure to identify the defective assembly.

8-7. The second maintenance level isolates the trouble to the component level. Schematic diagrams are provided of each individual assembly plus a detailed circuit description to aid in troubleshooting down to the component level within the assembly.

8-8. RECOMMENDED TEST EQUIPMENT

8-9. Test equipment and accessories required to maintain the Model 8755A are listed in Table 1-3. If the equipment listed is not available, equipment that meets the minimum specifications shown may be substituted.

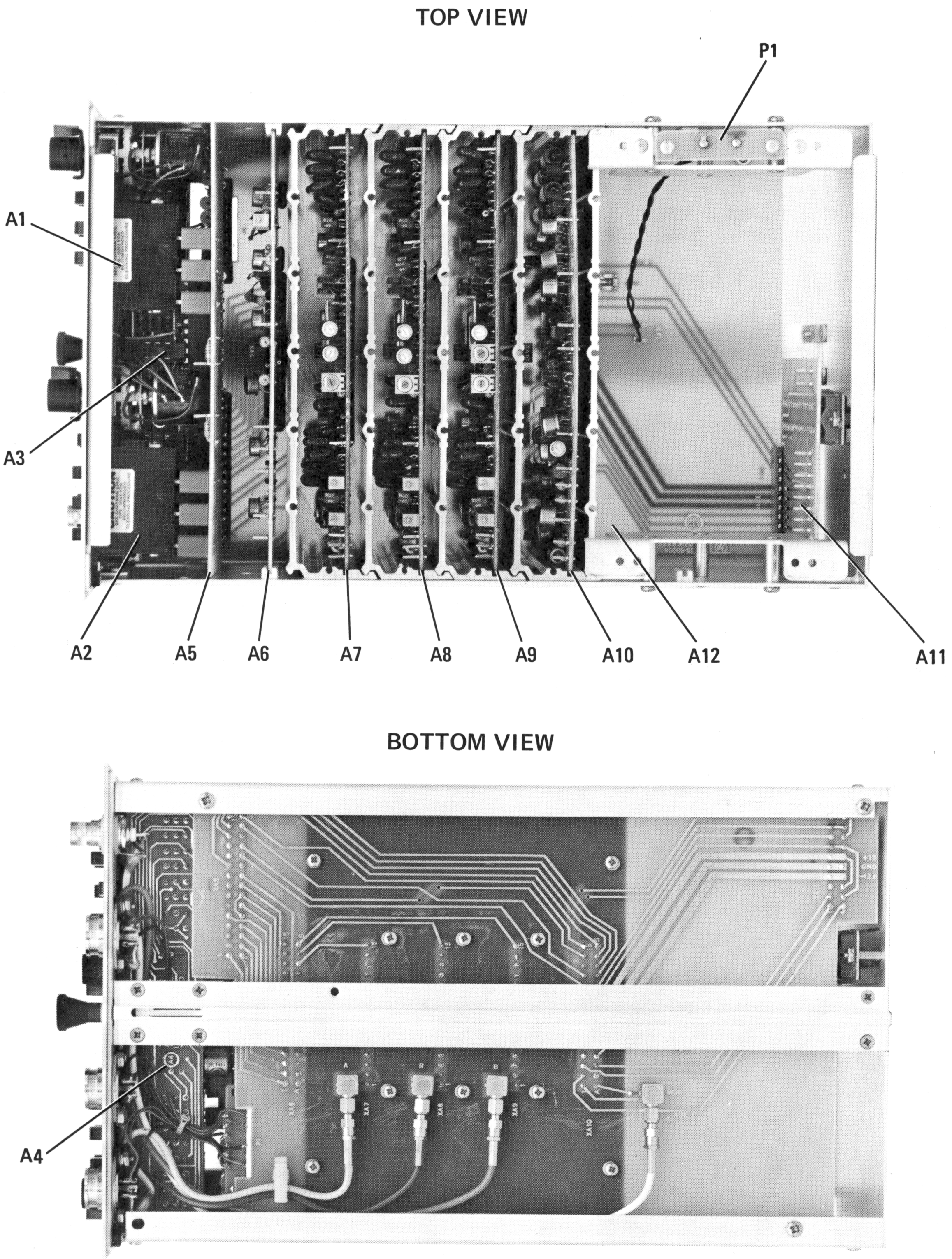

TOP VIEW
P1
A1
A3
A2
A5
A6
A7
A8
A9
A10
A12
A11
BOTTOM VIEW
A4

Figure 8-1. Major Assemblies Location

SCHEMATIC DIAGRAM NOTES

For symbols not shown, refer to USA Standard Y32.2—1967 "Graphic Symbols for Electrical and Electronic Diagrams."

Logic Symbols used conform to MIL-STD-806B (Military Standard 806B) "Graphic Symbols for Logic Diagrams."

Resistance is in ohms, capacitance is in picofarads, and inductance is in microhenries unless otherwise noted.

P/O = part of.

* Asterisk denotes a factory-selected value. Value shown is typical. Capacitors may be omitted or resistors jumpered.

⊘ Screwdriver adjustment

○ Panel control

▭ Encloses front panel designations

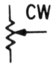
⬚ Encloses rear panel designation

——— - - ——— Circuit assembly borderline

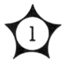
– – – – – – Other assembly borderline

——▶—— Heavy line with arrows indicates path and direction of main signal.

– –▶– – Heavy dashed line with arrows indicates path and direction of main feedback.

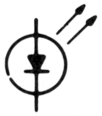


Wiper moves toward CW with clockwise rotation of control as viewed from shaft or knob.

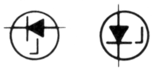


Numbers in stars on circuit assemblies show locations of test points.

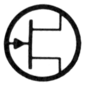
⬭ Encloses wire color code. Code used (MIL-STD-681) is the same as the resistor color code. First number identifies the base color, second number the wider stripe, and the third number identifies the narrower strip, e.g., (947) denotes white base, yellow wide stripe, violet narrow stripe.



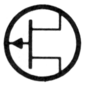
Light-emitting diode.



Voltage regulator (breakdown diode).



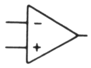
Denotes Field Effect transistor (FET) with N-type base.



Denotes FET with P-type base.

Figure 8-2. Schematic Diagram Notes (1 of 4)

SCHEMATIC DIAGRAM NOTES



Operational Amplifier (integrated circuit).

Voltages noted within circuits are measured with respect to chassis ground and have a ±10% tolerance.

Conditions for waveforms and dc voltages on schematics are as follows:

a. Connect equipment as shown in test setup below with thermistor mount connected to modulator.

b. Set 8620A for fast sweep across the band of interest. Adjust 8621A POWER LEVEL control for —3 dBm indication on power meter.

c. Disconnect thermistor mount and reconnect Detector R to modulator.

d. Set 8755A controls for both Channel A and B as follows:

OFFSET CAL ON-OFF Switch	OFF
OFFSET dB Thumbwheel Switches	—00
dB/DIV	10
DISPLAY	POSITION
SMOOTHING	Out

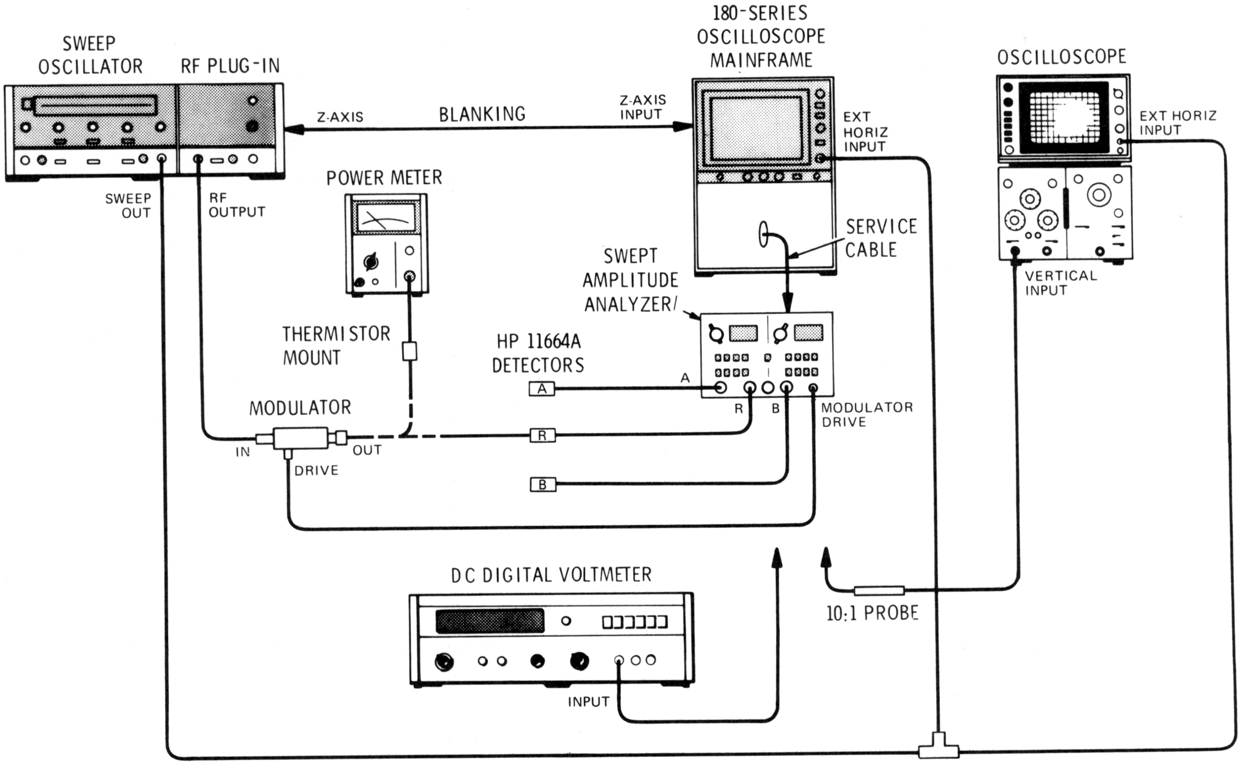
e. Adjust CHANNEL A POSITION screwdriver adjustment to place the trace two large divisions below the center graticule line.

f. Adjust CHANNEL B POSITION screwdriver adjustment to place the trace two large divisions above the center graticule line.

g. Press both DISPLAY R pushbuttons.

Figure 8-2. Schematic Diagram Notes (2 of 4)

TEST SETUP FOR WAVEFORMS AND VOLTAGES SHOWN ON SCHEMATICS


SWEEP OSCILLATOR
RF PLUG-IN
SWEEP OUT
RF OUTPUT
Z-AXIS
BLANKING
Z-AXIS INPUT
180-SERIES OSCILLOSCOPE MAINFRAME
EXT HORIZ INPUT
SERVICE CABLE
OSCILLOSCOPE
EXT HORIZ INPUT
VERTICAL INPUT
POWER METER
THERMISTOR MOUNT
SWEPT AMPLITUDE ANALYZER
HP 11664A DETECTORS
A
R
B
MODULATOR DRIVE
MODULATOR
IN
OUT
DRIVE
DC DIGITAL VOLTMETER
INPUT
10:1 PROBE

NOTE

When checking A7 or A9 27.8 kHz Log Amplifier, connect Detector A (for A7) or Detector B (for A9) to the modulator.

EQUIPMENT:

Swept Amplitude Analyzer/Scope	HP 8755A/180, Option 807
Power Meter and Thermistor Mount	HP 432A/8478B
Detectors (3 required)	HP 11664A
Modulator	HP 11665A/B
Sweep Oscillator	HP 8620A
RF Section	HP 8621 with Osc. Module
Oscilloscope	HP 180A/1801A/1820A
DC Digital Voltmeter	HP 3460B
Service Cable	HP 5060-0303

Figure 8-2. Schematic Diagram Notes (3 of 4)

Test point symbols. Stars are numbered or lettered for easy correlation of schematic diagrams, procedures, and locator illustrations.

Arrow connecting star to measurement point signifies no measuring aid provided.

Star shown electrically connected to circuit signifies measuring aid (metal post, circuit pad, etc.) provided.

Interconnection information.

Circled letter indicates circuit path continues on another schematic diagram. Look for same circled letter on service sheet indicated by adjacent bold number (3, in this example).

Assembly part number

Assembly name

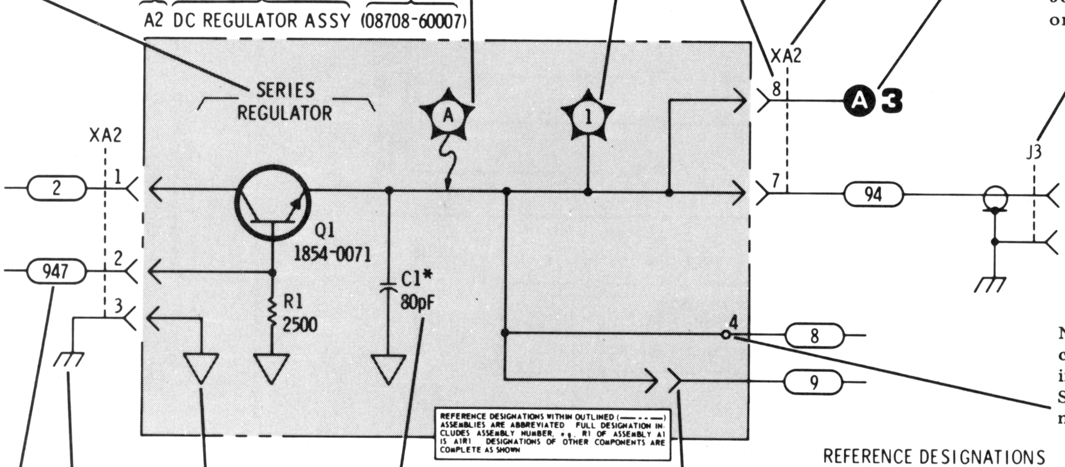
Assembly designation

Stage name

Plug-in connection information. Socket designation for A2 assembly.

Number indicates pin of socket (XA2).

J3 not mounted on assembly A2.



REFERENCE DESIGNATIONS WITHIN OUTLINED (—— - - ——) ASSEMBLIES ARE ABBREVIATED FULL DESIGNATION INCLUDES ASSEMBLY NUMBER, e.g., R1 OF ASSEMBLY A1 IS A1R1 DESIGNATIONS OF OTHER COMPONENTS ARE COMPLETE AS SHOWN

Non-plug-in connection information. Solder point numbered.

REFERENCE DESIGNATIONS

NO PREFIX	A2 ASSY
A2 J3 XA2	C1 Q1 R1

DELETED:

2

A2

Circuit board common.

Conducting connection to chassis or frame.

Value selected for best operation. Value shown is average or most commonly selected value.

Connector symbols within the borderlines of circuit assemblies signify connections to the assembly which is separate from those made through the integral plug part of the assembly.

Assembly reference designator(s).

Large numbers in lower right corners of schematic diagrams are service sheet numbers. They are provided for convenience in tracing interconnections.

Wire color code. Code used (MIL-STD-681) is the same as the resistor color code. First number identifies the base color, second number the wider stripe, and the third number the narrower stripe. Example, (947) denotes white base, yellow wide stripe, violet narrow stripe.

Reference designators deleted by circuit changes are listed here.

List of all the reference designations on the diagram.

Figure 8-2. Schematic Diagram Notes (4 of 4)

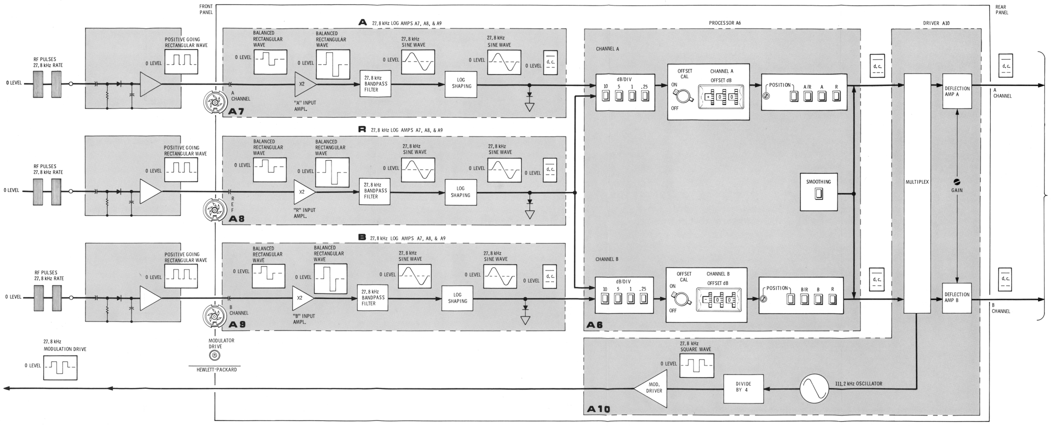

FRONT PANEL
REAR PANEL
A 27.8 kHz LOG AMPS A7, A8, & A9
R 27.8 kHz LOG AMPS A7, A8, & A9
B 27.8 kHz LOG AMPS A7, A8, & A9
RF PULSES 27.8 kHz RATE
0 LEVEL
POSITIVE GOING RECTANGULAR WAVE
BALANCED RECTANGULAR WAVE
X2
"A" INPUT AMPL.
"R" INPUT AMPL.
"B" INPUT AMPL.
27.8 kHz BANDPASS FILTER
27.8 kHz SINE WAVE
LOG SHAPING
d.c.
A CHANNEL
REF
B CHANNEL
A7
A8
A9
MODULATOR DRIVE
HEWLETT·PACKARD
27.8 kHz MODULATION DRIVE
PROCESSOR A6
CHANNEL A
CHANNEL B
dB/DIV
10
5
1
.25
OFFSET CAL
ON
OFF
CHANNEL A OFFSET dB
CHANNEL B OFFSET dB
POSITION
A/R
A
R
B/R
B
SMOOTHING
A6
DRIVER A10
MULTIPLEX
DEFLECTION AMP A
DEFLECTION AMP B
GAIN
TO 180 SERIES MAINFRAME
27.8 kHz SQUARE WAVE
MOD. DRIVER
DIVIDE BY 4
111.2 kHz OSCILLATOR
A10

Figure 8-2A. Simplified Troubleshooting Block Diagram

◀SIMPLIFIED TROUBLESHOOTING BLOCK DIAGRAM

MODEL 8755A OVERALL CIRCUIT DESCRIPTION

Measurement Test Setup

A typical test setup of the 8755A, together with the 11665A/B Modulator and three 11664A Detectors is shown in Figure 8-3. The Sweep Oscillator RF output is applied to the Model 11665A/B Modulator. The RF signal is then amplitude modulated at 27.8 kHz rate. The modulated signal is fed to a dual directional coupler or reflectometer. Three Model 11664A Detectors are used to detect the modulation. The incident signal is detected by the reference detector. The reflected signal is detected by either the A or B detector. However, normally channel A is used for the reflected signal. The device under test is connected to the directional coupler's main line output. If the device under test is a two port device, the B detector is connected to its output port. The ratio of the A detector signal to the R (reference) detector signal is reflection coefficient and the ratio of the B detector signal to the reference channel signal is insertion loss (or gain) of the device under test. Therefore, reflection coefficient (return loss) and insertion loss may be displayed simultaneously.

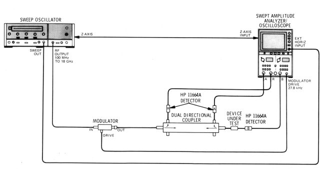

SWEEP OSCILLATOR
Z-AXIS
SWEEP OUT
RF OUTPUT 100 MHz TO 18 GHz
SWEPT AMPLITUDE ANALYZER/ OSCILLOSCOPE
Z-AXIS INPUT
EXT HORIZ INPUT
A
R
B
MODULATOR DRIVE 27.8 kHz
HP 11664A DETECTOR
MODULATOR
IN
OUT
DRIVE
DUAL DIRECTIONAL COUPLER
DEVICE UNDER TEST
HP 11664A DETECTOR

Figure 8-3. Model 8755A Typical Test Setup

Simplified Block Diagram Description of the 8755A, Figure 8-4, shows a simplified block diagram of the 8755A. The 27.8 kHz signals from the three detectors are applied to three identical amplifiers in the 8755A. The output signals of the three amplifiers are dc voltages. These dc voltages are applied to a processor assembly which contains the switching, offsetting, and display control functions. After processing, the dc voltages are applied to a driver assembly which contains the multiplex function, the CRT deflection drivers, and a 27.8 kHz modulation driver.

MODEL 8755A OVERALL CIRCUIT DESCRIPTION (cont'd)

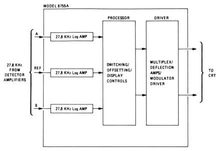

MODEL 8755A
PROCESSOR
DRIVER
27.8 KHz FROM DETECTOR AMPLIFIERS
A
REF
B
27.8 KHz Log AMP
27.8 KHz Log AMP
27.8 KHz Log AMP
SWITCHING/ OFFSETTING/ DISPLAY CONTROLS
MULTIPLEX/ DEFLECTION AMPS/ MODULATOR DRIVER
TO CRT

Figure 8-4. Model 8755A Simplified Block Diagram

Model 11664 Detector Circuit Description

Figure 8-5 shows a simplified schematic of one of the 11664A Detectors. The three detectors are identical and may be interchanged. They consist of a hot Carrier Diode, impedance matching components, and an amplifier or preamp.

A more detailed schematic of the Model 11664A is shown in Figure 8-6.

Q1 and Q2 form a feedback pair whose gain is about three mainly determined by R3 and R6.

Q3 and Q4 is a current driver which permits the use of a long cable (up to 50 feet) between the detector and the 8755A.

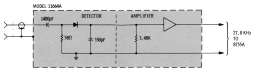
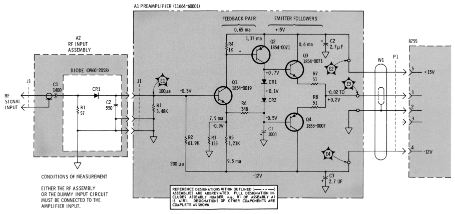

MODEL 11664A
1400pF
DETECTOR
AMPLIFIER
58Ω
550pF
3.48K
27.8 KHz TO 8755A

Figure 8-5. Model 11664A Simplified Schematic


A2 RF INPUT ASSEMBLY
DIODE (0960-2058)
J1
C1 1400
CR1
C2 550
R1 57
RF SIGNAL INPUT
A1 PREAMPLIFIER (11664-60001)
FEEDBACK PAIR
EMITTER FOLLOWERS
0.65 ma
+15V
1.37 ma
R4 1K
Q2 1854-0071
0.6 ma
C2 2.7µF
Q3 1854-0071
E1
E2
E3
E4
J1
100µa
-0.3V
R1 3.48K
Q1 1854-0019
+0.7V
CR1
+0.1V
CR2
R7 51
R8 51
-0.02 TO +0.2V
R6 348
7.5 ma
-0.9V
-0.5V
Q4 1853-0007
C1 1000
R2 61.9K
R3 133
R5 1.21K
9.5 ma
200 µa
-12V
C3 2.7 UF
W1
P1
8755
5
+15V
1
2
3
4
-12V
REFERENCE DESIGNATIONS WITHIN OUTLINED (—— - - ——) ASSEMBLIES ARE ABBREVIATED. FULL DESIGNATION INCLUDES ASSEMBLY NUMBER; e.g., R1 OF ASSEMBLY A1 IS A1R1. DESIGNATIONS OF OTHER COMPONENTS ARE COMPLETE AS SHOWN.

CONDITIONS OF MEASUREMENT

EITHER THE RF ASSEMBLY OR THE DUMMY INPUT CIRCUIT MUST BE CONNECTED TO THE AMPLIFIER INPUT.

Figure 8-6. Model 11664A Amplifier Schematic

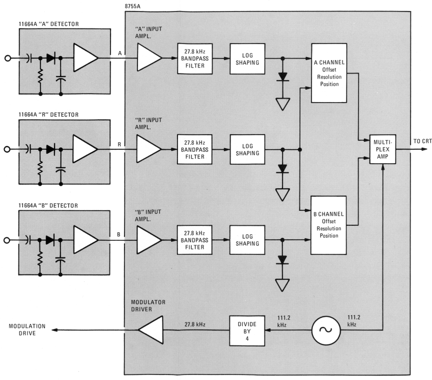

8755A
11664A "A" DETECTOR
11664A "R" DETECTOR
11664A "B" DETECTOR
A
R
B
"A" INPUT AMPL.
"R" INPUT AMPL.
"B" INPUT AMPL.
27.8 kHz BANDPASS FILTER
27.8 kHz BANDPASS FILTER
27.8 kHz BANDPASS FILTER
LOG SHAPING
LOG SHAPING
LOG SHAPING
A CHANNEL Offset Resolution Position
B CHANNEL Offset Resolution Position
MULTI-PLEX AMP
TO CRT
MODULATOR DRIVER
MODULATION DRIVE
27.8 kHz
DIVIDE BY 4
111.2 kHz
111.2 kHz

Figure 8-7. Model 8755A Block Diagram

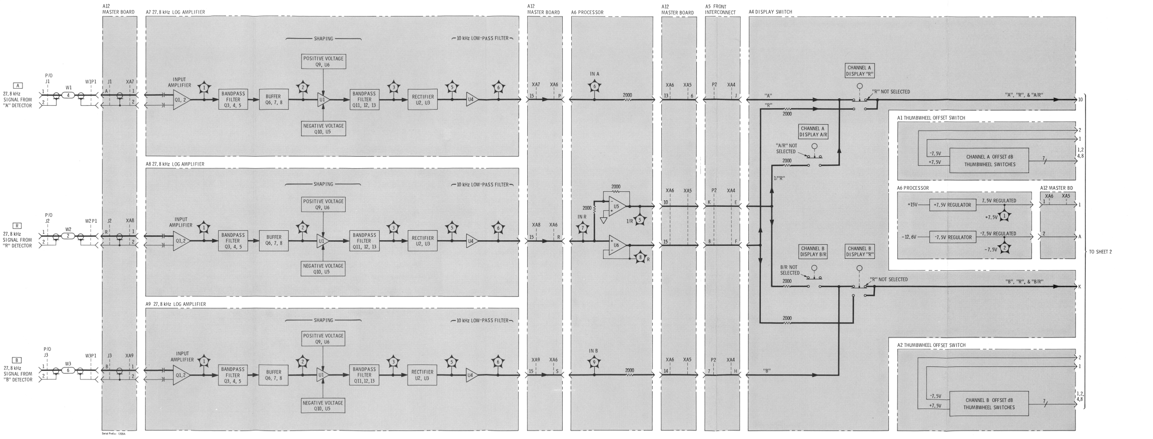
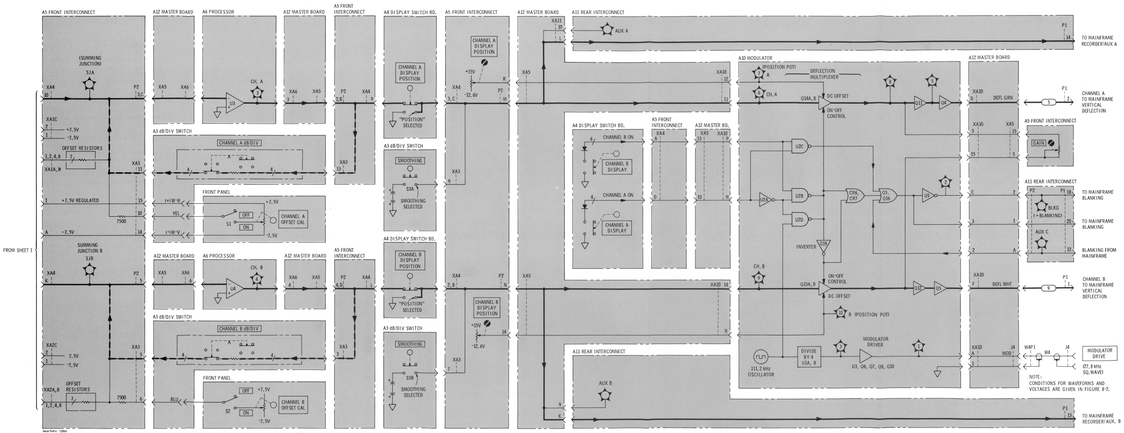

A12 MASTER BOARD
A7 27.8 kHz LOG AMPLIFIER
A8 27.8 kHz LOG AMPLIFIER
A9 27.8 kHz LOG AMPLIFIER
A6 PROCESSOR
A5 FRONT INTERCONNECT
A4 DISPLAY SWITCH
A
27.8 kHz SIGNAL FROM "A" DETECTOR
R
27.8 kHz SIGNAL FROM "R" DETECTOR
B
27.8 kHz SIGNAL FROM "B" DETECTOR
P/O J1
P/O J2
P/O J3
W1
W2
W3
W1P1
W2P1
W3P1
J1
J2
J3
XA7
XA8
XA9
XA6
XA5
XA4
P2
SHAPING
10 kHz LOW-PASS FILTER
INPUT AMPLIFIER
Q1, 2
BANDPASS FILTER Q3, 4, 5
BUFFER Q6, 7, 8
POSITIVE VOLTAGE Q9, U6
NEGATIVE VOLTAGE Q10, U5
U1
BANDPASS FILTER Q11, 12, 13
RECTIFIER U2, U3
U4
IN A
IN R
IN B
2000
U5
U6
1/R
R
CHANNEL A DISPLAY "R"
"R" NOT SELECTED
"A"
"R"
"A", "R", & "A/R"
CHANNEL A DISPLAY A/R
"A/R" NOT SELECTED
1/"R"
CHANNEL B DISPLAY B/R
CHANNEL B DISPLAY "R"
B/R NOT SELECTED
"B", "R", & "B/R"
"B"
A1 THUMBWHEEL OFFSET SWITCH
CHANNEL A OFFSET dB THUMBWHEEL SWITCHES
A2 THUMBWHEEL OFFSET SWITCH
CHANNEL B OFFSET dB THUMBWHEEL SWITCHES
-7.5V
+7.5V
A6 PROCESSOR
+15V
+7.5V REGULATOR
7.5V REGULATED
-12.6V
-7.5V REGULATOR
-7.5V REGULATED
A12 MASTER BD
1,2 4,8
TO SHEET 2

Figure 8-8. Troubleshooting Block Diagram (1 of 2)


FROM SHEET 1
A5 FRONT INTERCONNECT
(SUMMING JUNCTION)
SJA
XA4
P2
XA1C
+7.5V
-7.5V
OFFSET RESISTORS
1,2,4,8
XA1A, B
XA3
+7.5V REGULATED
7500
SUMMING JUNCTION B
SJB
XA2C
XA2A, B
OFFSET RESISTORS
A12 MASTER BOARD
XA5
XA6
A6 PROCESSOR
CH. A
U3
CH. B
U4
A3 dB/DIV SWITCH
CHANNEL A dB/DIV
CHANNEL B dB/DIV
FRONT PANEL
(+) W-R
YEL
(-) W-V
BLU
S1
S2
OFF
ON
CHANNEL A OFFSET CAL
CHANNEL B OFFSET CAL
A5 FRONT INTERCONNECT
A4 DISPLAY SWITCH BD.
CHANNEL A DISPLAY POSITION
CHANNEL B DISPLAY POSITION
"POSITION" SELECTED
SMOOTHING
S3A
S3B
SMOOTHING SELECTED
+15V
-12.6V
A11 REAR INTERCONNECT
XA11
AUX A
AUX B
XA10
CHANNEL B ON
CHANNEL A ON
CHANNEL B DISPLAY
CHANNEL A DISPLAY
A12 MASTER BD.
A10 MODULATOR
(POSITION POT) A
DEFLECTION MULTIPLEXER
DC OFFSET
Q14A, B
ON-OFF CONTROL
Q11
Q4
U2A
U2B
U2C
U2D
CR6, CR7
Q3, Q16
Q9
INVERTER
Q19
Q15A, B
Q12
Q5
B (POSITION POT)
111.2 kHz OSCILLATOR
DIVIDE BY 4 U1A, B
MODULATOR DRIVER
U3, Q6, Q7, Q8, Q10
DEFL GRN
DEFL WHT
MOD
J4
W4P1
W4
P1
CHANNEL A TO MAINFRAME VERTICAL DEFLECTION
GAIN
BLKG (+BLANKING)
AUX C
TO MAINFRAME BLANKING
TO MAINFRAME BLANKING
BLANKING FROM MAINFRAME
CHANNEL B TO MAINFRAME VERTICAL DEFLECTION
MODULATOR DRIVE
(27.8 kHz SQ. WAVE)
TO MAINFRAME RECORDER/AUX A
TO MAINFRAME RECORDER/AUX. B

NOTE:
CONDITIONS FOR WAVEFORMS AND VOLTAGES ARE GIVEN IN FIGURE 8-2.

Serial Prefix: 1209A

Figure 8-8. Troubleshooting Block Diagram (2 of 2)

EQUIPMENT:

Swept Amplitude Analyzer/Oscilloscope	HP 8755A/182A
Detectors (3 Required)	HP 11664A
Modulator	HP 11665A/B
Sweep Oscillator	HP 8620 mainframe with: HP 8621B and 86330B plus 86320A (0.1 to 4.2 GHz)
Directional Coupler	HP 778D
0—60 dB Step Attenuator (calibrated)	HP 355D
Power Meter and Thermistor Mount	HP 432A/8478B

8755A TROUBLESHOOTING

To troubleshoot the Model 8755A with power applied, it is necessary to extend the 8755A with a service cable, HP part No.5060-0303, or install the Model 8755A into a 180D (Rack Style) Oscilloscope with the oscilloscope top and bottom covers removed.

◆ TROUBLESHOOTING BLOCK DIAGRAM

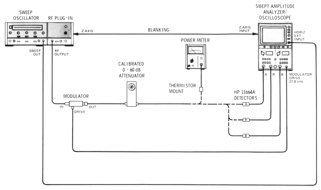

SWEEP OSCILLATOR
RF PLUG-IN
SWEEP OUT
RF OUTPUT
Z-AXIS
BLANKING
Z-AXIS INPUT
SWEPT AMPLITUDE ANALYZER/ OSCILLOSCOPE
HORIZ EXT INPUT
POWER METER
CALIBRATED 0 - 60 dB ATTENUATOR
THERMISTOR MOUNT
MODULATOR
IN
OUT
DRIVE
HP 11664A DETECTORS
A
R
B
MODULATOR DRIVE 27.8 kHz

Figure 8-9. Troubleshooting Test Setup for Absolute Power Measurement

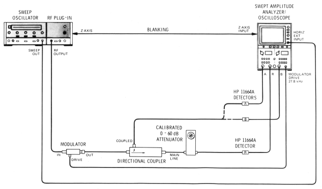
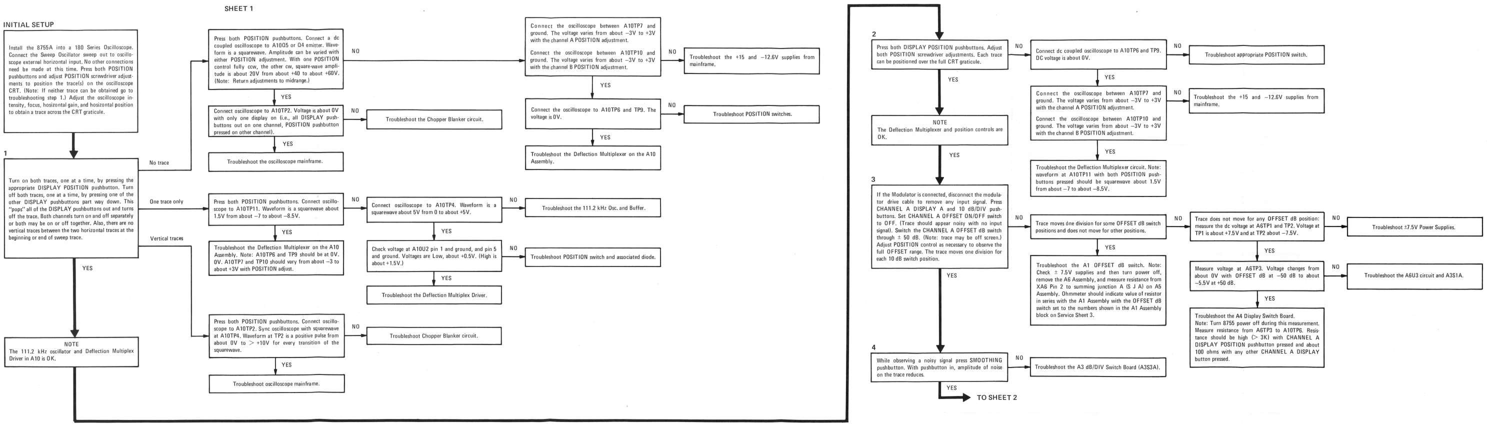

SWEEP OSCILLATOR
RF PLUG-IN
SWEEP OUT
RF OUTPUT
Z-AXIS
BLANKING
Z-AXIS INPUT
SWEPT AMPLITUDE ANALYZER/ OSCILLOSCOPE
HORIZ EXT INPUT
A
R
B
MODULATOR DRIVE 27.8 kHz
HP 11664A DETECTORS
CALIBRATED 0 - 60 dB ATTENUATOR
COUPLED
HP 11664A DETECTOR
MODULATOR
IN
OUT
DRIVE
DIRECTIONAL COUPLER
MAIN LINE

Figure 8-10. Troubleshooting Test Setup for Ratio Measurements



Install the 8755A into a 180 Series Oscilloscope. Connect the Sweep Oscillator sweep out to oscilloscope external horizontal input. No other connections need be made at this time. Press both POSITION pushbuttons and adjust POSITION screwdriver adjustments to position the trace(s) on the oscilloscope CRT. (Note: If neither trace can be obtained go to troubleshooting step 1.) Adjust the oscilloscope intensity, focus, hosizontal gain, and hosizontal position to obtain a trace across the CRT graticule.

Turn on both traces, one at a time, by pressing the appropriate DISPLAY POSITION pushbutton. Turn off both traces, one at a time, by pressing one of the other DISPLAY pushbuttons part way down. This "pops" all of the DISPLAY pushbuttons out and turns off the trace. Both channels turn on and off separately or both may be on or off together. Also, there are no vertical traces between the two horizontal traces at the beginning or end of sweep trace.

NOTE
The 111.2 kHz oscillator and Deflection Multiplex Driver in A10 is OK.

Press both POSITION pushbuttons. Connect a dc coupled oscilloscope to A10Q5 or Q4 emitter. Waveform is a squarewave. Amplitude can be varied with either POSITION adjustment. With one POSITION control fully ccw, the other cw, square-wave amplitude is about 20V from about +40 to about +60V. (Note: Return adjustments to midrange.)

Connect oscilloscope to A10TP2. Voltage is about 0V with only one display on (i.e., all DISPLAY pushbuttons out on one channel, POSITION pushbutton pressed on other channel).

Troubleshoot the oscilloscope mainframe.

Troubleshoot the Chopper Blanker circuit.

Connect the oscilloscope between A10TP7 and ground. The voltage varies from about –3V to +3V with the channel A POSITION adjustment.

Connect the oscilloscope between A10TP10 and ground. The voltage varies from about –3V to +3V with the channel B POSITION adjustment.

Troubleshoot the +15 and –12.6V supplies from mainframe.

Connect the oscilloscope to A10TP6 and TP9. The voltage is 0V.

Troubleshoot POSITION switches.

Troubleshoot the Deflection Multiplexer on the A10 Assembly.

Press both POSITION pushbuttons. Connect oscilloscope to A10TP11. Waveform is a squarewave about 1.5V from about –7 to about –8.5V.

Troubleshoot the Deflection Multiplexer on the A10 Assembly. Note: A10TP6 and TP9 should be at 0V. 0V. A10TP7 and TP10 should vary from about –3 to about +3V with POSITION adjust.

Connect oscilloscope to A10TP4. Waveform is a squarewave about 5V from 0 to about +5V.

Troubleshoot the 111.2 kHz Osc. and Buffer.

Check voltage at A10U2 pin 1 and ground, and pin 5 and ground. Voltages are Low, about +0.5V. (High is about +1.5V.)

Troubleshoot POSITION switch and associated diode.

Troubleshoot the Deflection Multiplex Driver.

Press both POSITION pushbuttons. Connect oscilloscope to A10TP2. Sync oscilloscope with squarewave at A10TP4. Waveform at TP2 is a positive pulse from about 0V to > +10V for every transition of the squarewave.

Troubleshoot Chopper Blanker circuit.

Troubleshoot oscilloscope mainframe.

Press both DISPLAY POSITION pushbuttons. Adjust both POSITION screwdriver adjustments. Each trace can be positioned over the full CRT graticule.

Connect dc coupled oscilloscope to A10TP6 and TP9. DC voltage is about 0V.

Troubleshoot appropriate POSITION switch.

Connect the oscilloscope between A10TP7 and ground. The voltage varies from about –3V to +3V with the channel A POSITION adjustment.

Connect the oscilloscope between A10TP10 and ground. The voltage varies from about –3V to +3V with the channel B POSITION adjustment.

Troubleshoot the +15 and –12.6V supplies from mainframe.

Troubleshoot the Deflection Multiplexer circuit. Note: waveform at A10TP11 with both POSITION pushbuttons pressed should be squarewave about 1.5V from about –7 to about –8.5V.

NOTE
The Deflection Multiplexer and position controls are OK.

If the Modulator is connected, disconnect the modulator drive cable to remove any input signal. Press CHANNEL A DISPLAY A and 10 dB/DIV pushbuttons. Set CHANNEL A OFFSET ON/OFF switch to OFF. (Trace should appear noisy with no input signal). Switch the CHANNEL A OFFSET dB switch through ± 50 dB. (Note: trace may be off screen.) Adjust POSITION control as necessary to observe the full OFFSET range. The trace moves one division for each 10 dB switch position.

Trace moves one division for some OFFSET dB switch positions and does not move for other positions.

Troubleshoot the A1 OFFSET dB switch. Note: Check ± 7.5V supplies and then turn power off, remove the A6 Assembly, and measure resistance from XA6 Pin 2 to summing junction A (S J A) on A5 Assembly. Ohmmeter should indicate value of resistor in series with the A1 Assembly with the OFFSET dB switch set to the numbers shown in the A1 Assembly block on Service Sheet 3.

Trace does not move for any OFFSET dB position: measure the dc voltage at A6TP1 and TP2. Voltage at TP1 is about +7.5V and at TP2 about –7.5V.

Troubleshoot ±7.5V Power Supplies.

Measure voltage at A6TP3. Voltage changes from about 0V with OFFSET dB at –50 dB to about –5.5V at +50 dB.

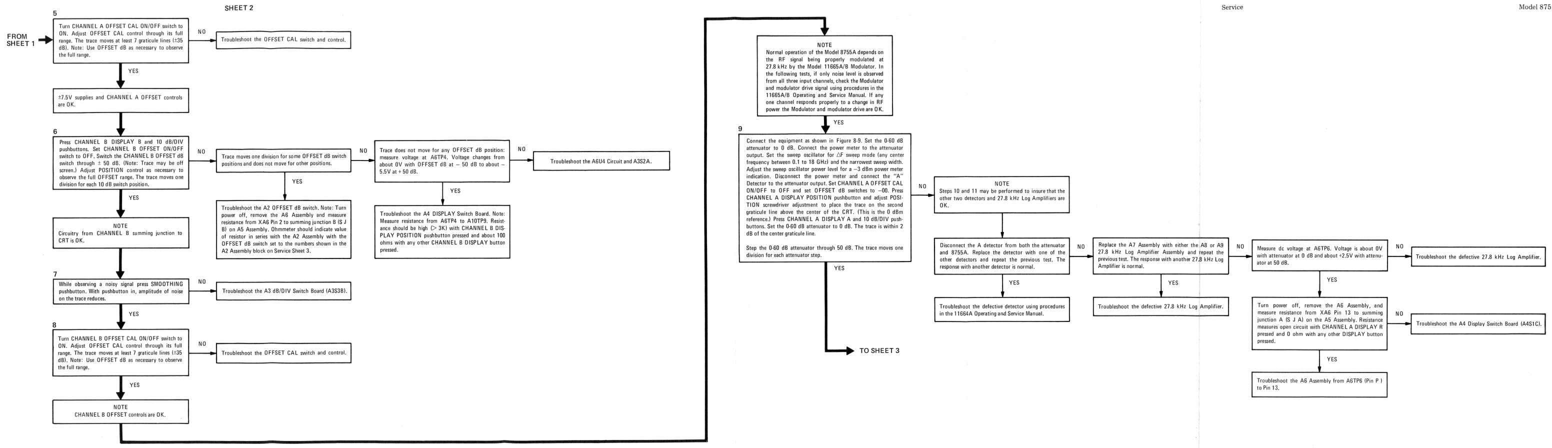
Troubleshoot the A6U3 circuit and A3S1A.

Troubleshoot the A4 Display Switch Board.
Note: Turn 8755 power off during this measurement. Measure resistance from A6TP3 to A10TP6. Resistance should be high (> 3K) with CHANNEL A DISPLAY POSITION pushbutton pressed and about 100 ohms with any other CHANNEL A DISPLAY button pressed.

While observing a noisy signal press SMOOTHING pushbutton. With pushbutton in, amplitude of noise on the trace reduces.

Troubleshoot the A3 dB/DIV Switch Board (A3S3A).

Figure 8-11. Troubleshooting Flow Diagram (1 of 3)



5

Turn CHANNEL A OFFSET CAL ON/OFF switch to ON. Adjust OFFSET CAL control through its full range. The trace moves at least 7 graticule lines (±35 dB). Note: Use OFFSET dB as necessary to observe the full range.

Troubleshoot the OFFSET CAL switch and control.

±7.5V supplies and CHANNEL A OFFSET controls are OK.

6

Press CHANNEL B DISPLAY B and 10 dB/DIV pushbuttons. Set CHANNEL B OFFSET ON/OFF switch to OFF. Switch the CHANNEL B OFFSET dB switch through ± 50 dB. (Note: Trace may be off screen.) Adjust POSITION control as necessary to observe the full OFFSET range. The trace moves one division for each 10 dB switch position.

Trace moves one division for some OFFSET dB switch positions and does not move for other positions.

Troubleshoot the A2 OFFSET dB switch. Note: Turn power off, remove the A6 Assembly and measure resistance from XA6 Pin 2 to summing junction B (S J B) on A5 Assembly. Ohmmeter should indicate value of resistor in series with the A2 Assembly with the OFFSET dB switch set to the numbers shown in the A2 Assembly block on Service Sheet 3.

Trace does not move for any OFFSET dB position: measure voltage at A6TP4. Voltage changes from about 0V with OFFSET dB at − 50 dB to about − 5.5V at + 50 dB.

Troubleshoot the A6U4 Circuit and A3S2A.

Troubleshoot the A4 DISPLAY Switch Board. Note: Measure resistance from A6TP4 to A10TP9. Resistance should be high (> 3K) with CHANNEL B DISPLAY POSITION pushbutton pressed and about 100 ohms with any other CHANNEL B DISPLAY button pressed.

NOTE
Circuitry from CHANNEL B summing junction to CRT is OK.

7

While observing a noisy signal press SMOOTHING pushbutton. With pushbutton in, amplitude of noise on the trace reduces.

Troubleshoot the A3 dB/DIV Switch Board (A3S3B).

8

Turn CHANNEL B OFFSET CAL ON/OFF switch to ON. Adjust OFFSET CAL control through its full range. The trace moves at least 7 graticule lines (±35 dB). Note: Use OFFSET dB as necessary to observe the full range.

Troubleshoot the OFFSET CAL switch and control.

NOTE
CHANNEL B OFFSET controls are OK.

NOTE
Normal operation of the Model 8755A depends on the RF signal being properly modulated at 27.8 kHz by the Model 11665A/B Modulator. In the following tests, if only noise level is observed from all three input channels, check the Modulator and modulator drive signal using procedures in the 11665A/B Operating and Service Manual. If any one channel responds properly to a change in RF power the Modulator and modulator drive are OK.

9

Connect the equipment as shown in Figure 8-9. Set the 0-60 dB attenuator to 0 dB. Connect the power meter to the attenuator output. Set the sweep oscillator for ΔF sweep mode (any center frequency between 0.1 to 18 GHz) and the narrowest sweep width. Adjust the sweep oscillator power level for a −3 dBm power meter indication. Disconnect the power meter and connect the "A" Detector to the attenuator output. Set CHANNEL A OFFSET CAL ON/OFF to OFF and set OFFSET dB switches to −00. Press CHANNEL A DISPLAY POSITION pushbutton and adjust POSITION screwdriver adjustment to place the trace on the second graticule line above the center of the CRT. (This is the 0 dBm reference.) Press CHANNEL A DISPLAY A and 10 dB/DIV pushbuttons. Set the 0-60 dB attenuator to 0 dB. The trace is within 2 dB of the center graticule line.

Step the 0-60 dB attenuator through 50 dB. The trace moves one division for each attenuator step.

NOTE
Steps 10 and 11 may be performed to insure that the other two detectors and 27.8 kHz Log Amplifiers are OK.

Disconnect the A detector from both the attenuator and 8755A. Replace the detector with one of the other detectors and repeat the previous test. The response with another detector is normal.

Troubleshoot the defective detector using procedures in the 11664A Operating and Service Manual.

Replace the A7 Assembly with either the A8 or A9 27.8 kHz Log Amplifier Assembly and repeat the previous test. The response with another 27.8 kHz Log Amplifier is normal.

Troubleshoot the defective 27.8 kHz Log Amplifier.

Measure dc voltage at A6TP6. Voltage is about 0V with attenuator at 0 dB and about +2.5V with attenuator at 50 dB.

Troubleshoot the defective 27.8 kHz Log Amplifier.

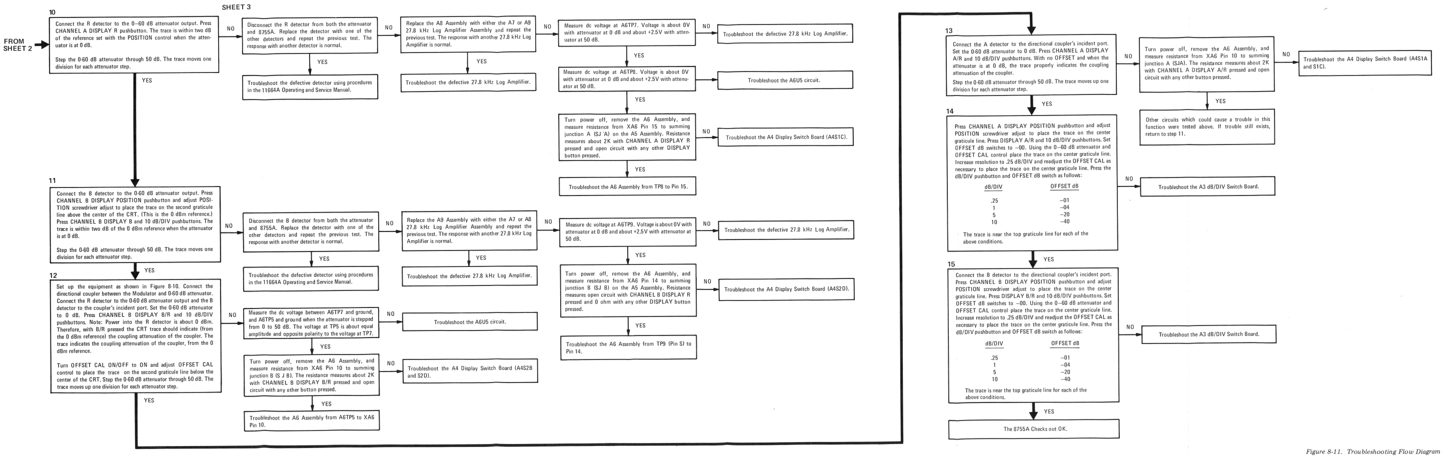
Turn power off, remove the A6 Assembly, and measure resistance from XA6 Pin 13 to summing junction A (S J A) on the A5 Assembly. Resistance measures open circuit with CHANNEL A DISPLAY R pressed and 0 ohm with any other DISPLAY button pressed.

Troubleshoot the A4 Display Switch Board (A4S1C).

Troubleshoot the A6 Assembly from A6TP6 (Pin P) to Pin 13.

TROUBLESHOOTING FLOW DIAGRAM (1 of 3)

Figure 8-11. Troubleshooting Flow Diagram (2 of 3)



10

Connect the R detector to the 0–60 dB attenuator output. Press CHANNEL A DISPLAY R pushbutton. The trace is within two dB of the reference set with the POSITION control when the attenuator is at 0 dB.

Step the 0-60 dB attenuator through 50 dB. The trace moves one division for each attenuator step.

Disconnect the R detector from both the attenuator and 8755A. Replace the detector with one of the other detectors and repeat the previous test. The response with another detector is normal.

Troubleshoot the defective detector using procedures in the 11664A Operating and Service Manual.

Replace the A8 Assembly with either the A7 or A9 27.8 kHz Log Amplifier Assembly and repeat the previous test. The response with another 27.8 kHz Log Amplifier is normal.

Troubleshoot the defective 27.8 kHz Log Amplifier.

Measure dc voltage at A6TP7. Voltage is about 0V with attenuator at 0 dB and about +2.5V with attenuator at 50 dB.

Troubleshoot the defective 27.8 kHz Log Amplifier.

Measure dc voltage at A6TP8. Voltage is about 0V with attenuator at 0 dB and about +2.5V with attenuator at 50 dB.

Troubleshoot the A6U5 circuit.

Turn power off, remove the A6 Assembly, and measure resistance from XA6 Pin 15 to summing junction A (SJ A) on the A5 Assembly. Resistance measures about 2K with CHANNEL A DISPLAY R pressed and open circuit with any other DISPLAY button pressed.

Troubleshoot the A4 Display Switch Board (A4S1C).

Troubleshoot the A6 Assembly from TP8 to Pin 15.

11

Connect the B detector to the 0-60 dB attenuator output. Press CHANNEL B DISPLAY POSITION pushbutton and adjust POSITION screwdriver adjust to place the trace on the second graticule line above the center of the CRT. (This is the 0 dBm reference.) Press CHANNEL B DISPLAY B and 10 dB/DIV pushbuttons. The trace is within two dB of the 0 dBm reference when the attenuator is at 0 dB.

Step the 0-60 dB attenuator through 50 dB. The trace moves one division for each attenuator step.

Disconnect the B detector from both the attenuator and 8755A. Replace the detector with one of the other detectors and repeat the previous test. The response with another detector is normal.

Troubleshoot the defective detector using procedures in the 11664A Operating and Service Manual.

Replace the A9 Assembly with either the A7 or A8 27.8 kHz Log Amplifier Assembly and repeat the previous test. The response with another 27.8 kHz Log Amplifier is normal.

Troubleshoot the defective 27.8 kHz Log Amplifier.

Measure dc voltage at A6TP9. Voltage is about 0V with attenuator at 0 dB and about +2.5V with attenuator at 50 dB.

Troubleshoot the defective 27.8 kHz Log Amplifier.

Turn power off, remove the A6 Assembly, and measure resistance from XA6 Pin 14 to summing junction B (SJ B) on the A5 Assembly. Resistance measures open circuit with CHANNEL B DISPLAY R pressed and 0 ohm with any other DISPLAY button pressed.

Troubleshoot the A4 Display Switch Board (A4S2D).

Troubleshoot the A6 Assembly from TP9 (Pin S) to Pin 14.

12

Set up the equipment as shown in Figure 8-10. Connect the directional coupler between the Modulator and 0-60 dB attenuator. Connect the R detector to the 0-60 dB attenuator output and the B detector to the coupler's incident port. Set the 0-60 dB attenuator to 0 dB. Press CHANNEL B DISPLAY B/R and 10 dB/DIV pushbuttons. Note: Power into the R detector is about 0 dBm. Therefore, with B/R pressed the CRT trace should indicate (from the 0 dBm reference) the coupling attenuation of the coupler. The trace indicates the coupling attenuation of the coupler, from the 0 dBm reference.

Turn OFFSET CAL ON/OFF to ON and adjust OFFSET CAL control to place the trace on the second graticule line below the center of the CRT. Step the 0-60 dB attenuator through 50 dB. The trace moves up one division for each attenuator step.

Measure the dc voltage between A6TP7 and ground, and A6TP5 and ground when the attenuator is stepped from 0 to 50 dB. The voltage at TP5 is about equal amplitude and opposite polarity to the voltage at TP7.

Troubleshoot the A6U5 circuit.

Turn power off, remove the A6 Assembly, and measure resistance from XA6 Pin 10 to summing junction B (S J B). The resistance measures about 2K with CHANNEL B DISPLAY B/R pressed and open circuit with any other button pressed.

Troubleshoot the A4 Display Switch Board (A4S2B and S2D).

Troubleshoot the A6 Assembly from A6TP5 to XA6 Pin 10.

13

Connect the A detector to the directional coupler's incident port. Set the 0-60 dB attenuator to 0 dB. Press CHANNEL A DISPLAY A/R and 10 dB/DIV pushbuttons. With no OFFSET and when the attenuator is at 0 dB, the trace properly indicates the coupling attenuation of the coupler.

Step the 0-60 dB attenuator through 50 dB. The trace moves up one division for each attenuator step.

Turn power off, remove the A6 Assembly, and measure resistance from XA6 Pin 10 to summing junction A (SJA). The resistance measures about 2K with CHANNEL A DISPLAY A/R pressed and open circuit with any other button pressed.

Troubleshoot the A4 Display Switch Board (A4S1A and S1C).

Other circuits which could cause a trouble in this function were tested above. If trouble still exists, return to step 11.

14

Press CHANNEL A DISPLAY POSITION pushbutton and adjust POSITION screwdriver adjust to place the trace on the center graticule line. Press DISPLAY A/R and 10 dB/DIV pushbuttons. Set OFFSET dB switches to –00. Using the 0–60 dB attenuator and OFFSET CAL control place the trace on the center graticule line. Increase resolution to .25 dB/DIV and readjust the OFFSET CAL as necessary to place the trace on the center graticule line. Press the dB/DIV pushbutton and OFFSET dB switch as follows:

dB/DIV	OFFSET dB
.25	–01
1	–04
5	–20
10	–40

The trace is near the top graticule line for each of the above conditions.

Troubleshoot the A3 dB/DIV Switch Board.

15

Connect the B detector to the directional coupler's incident port. Press CHANNEL B DISPLAY POSITION pushbutton and adjust POSITION screwdriver adjust to place the trace on the center graticule line. Press DISPLAY B/R and 10 dB/DIV pushbuttons. Set OFFSET dB switches to –00. Using the 0–60 dB attenuator and OFFSET CAL control place the trace on the center graticule line. Increase resolution to .25 dB/DIV and readjust the OFFSET CAL as necessary to place the trace on the center graticule line. Press the dB/DIV pushbutton and OFFSET dB switch as follows:

dB/DIV	OFFSET dB
.25	–01
1	–04
5	–20
10	–40

The trace is near the top graticule line for each of the above conditions.

Troubleshoot the A3 dB/DIV Switch Board.

The 8755A Checks out OK.

Figure 8-11. Troubleshooting Flow Diagram (3 of 3)

SERVICE SHEET 1

CIRCUIT DESCRIPTION

Input Amplifier

The 27.8 kHz signal from the 11664 Detector is fed to one of three identical amplifiers: A7, A8, or A9 in the 8755A. The signals are taken through front panel connectors to the amplifiers and applied to the input stage, Q1, Q2, and Q3, which has an overall gain of about 2. Q1 and Q2 is a differential amplifier which has good common mode rejection. Any signal that comes in on pins 1 and 2 in common will have no effect.

27.8 kHz Amplifier Bandpass Filter

R16 through C13 and emitter follower Q4 form an active low pass filter. C15 through R30 and Q5 and Q6 form an active high pass filter. Together they form a bandpass filter at 27.8 kHz with a passband 10 kHz wide. Q4 has a gain of about one and forms one pole of the low pass filter. Q5 and Q6 together have a gain of about one and form one pole of the high pass filter. Q7 and Q8 provide the drive to the logger (U1).

Log Amplifier

U1 is a log amplifier. It provides an output signal which changes linearly with the RF power applied to the Detectors. For low power levels (up to ≅−20 dBm) the output signal from the hot carrier diode detector is proportional to the RF input power. In this region, U1 acts as a true logarithmic converter. As the RF level increases, the output signal of the detector increases less than linearly, and finally approaches the region where it only changes as the square root of the RF power. For those signal levels, the amplifier (U1) has to provide a gain which is greater than the true logarithm in order to make up for signal compression in the detector. The output signal of U1 changes 50 mV per dB change in RF power applied to the detector over a range of 60 dB (which corresponds to approximately 100 dB change in detector output level).

The output level of U1 will vary from 0 to 4V peak-to-peak for a variation of 100 dB at its input.

The hybrid IC Log Amp contains 12 log amplifiers and 4 voltage amplifiers. Five log stages are fed by the input signal through a divider string. The remaining stages are fed through voltage amplifiers. As each log amplifier reaches the upper limit of its log region, the next log amplifier is turned on. R67, R70, and R74 are used to adjust the point at which some of the log amplifiers turn on and thus affect the overall shape of the input/output characteristic. The output of all the log stages are summed, amplified and appear at the IC's output. The gain of the voltage amplifier is temperature

SERVICE SHEET 1 (cont'd)

compensated by controlling the supply voltage using two temperature sensing diodes located on the IC chip. In order to reduce crosstalk between the three channels, each hybrid log amplifier is decoupled from the main supply line by its own power supply.

Rectifier

U2, U3, and the associated circuitry form a full wave rectifier. The 27.8 kHz signal is applied to U2's inverting input. The positive portion of U2's output is passed through CR8 and fed back to the input through R53. The gain of U2 for the positive going output is R53/R43 or about 1. The negative portion of U2's output is fed back through CR7. The gain for the negative output is about zero. The output of U2 (input to U3) is then a half wave rectified signal which is the opposite polarity of the negative portion of the input signal. The input signal is also fed to U3 through R49 and R54. U3 then has two input signals. The gain of U3 for the signal from U2 is R62/R59 or about 2. The gain of U3 for the signal which bypasses U2 is R62/R54 + R49 or about 1. The signal from U2 which is amplified by 2 occurs at the same time as the negative portion of the bypassed signal. The result is a full wave rectified signal at TP5 with a ripple frequency of 2 time 27.8 kHz. If the two signals at the input to U3 have the proper amplitude and phase relationship there will be no component of the original 27.8 kHz frequency. The proper amplitude relationship is maintained by the gain of U2. The phase relationship is maintained by designing R49, R54, and C33 for a phase shift to compensate for the delay through U2.

U2's response when the signal is passing through the zero crossover point is improved by forward coupling the input signal through C32 into the IC.

R58 provides a variable negative bias to U3's inverting input. The amount of offset is adjusted to obtain a zero dBm indication with 0 dBm peak power applied to the Model 11664A Detector. (This signal would actually measure −3 dBm average power on a power meter because it is square-wave modulated in the modulator.)

10 kHz Low Pass Filter

R65 through C44 and U4 is an active low pass filter with a 3 dB cut off frequency of 10 kHz. Although attenuated, any signal at 27.8 kHz could still pass through this filter. However, the full wave rectified ripple frequency of 55.6 kHz will be greatly attenuated and should not appear at the output at TP6.

SERVICE SHEET 1 (cont'd)

Positive and Negative Regulated Power Supplies with Temperature Compensation

Figure 8-12 shows the positive and negative power supply circuit. The −2.5V and +5V power supplies for the logger decouple the logger from the mainframe power supplies to reduce any 27.8 kHz signal on the mainframe power supplies from affecting the logger output. In addition to decoupling, the logger power supplies also compensate for temperature variations in the logger. Without compensation, any increase in temperature would cause the logger gain to increase. However, by changing the power supply voltages, inversely proportional to temperature, the logger gain will remain constant.

The negative supply output is in the emitter circuit of Q10. The emitter circuit provides the logger and the positive supply with about −2.5 Vdc. The −2.5V is also the reference voltage for Operational Amplifier U5 through a feedback path consisting of R14, R22, and the two temperature sensing diodes. U5 pin 2 is a virtual ground. Feedback current is determined primarily by +15/R23 or about 2.67 mA. Because of the high input impedance of U5, this current flows through R14 and the temperature sensing diodes. About 1.13V is dropped across R14 and about 1.32V across the diodes when the output voltage is −2.5V. The output voltage is then $E_O=I_OR14$ + Voltage across the diodes. The current is relatively constant and the voltage drop across the diodes changes inversely with temperature. Therefore, an increase in temperature will cause the −2.5V supply to go in a positive direction.

Figure 8-13 shows a simplified diagram of the −2.5V supply and Figure 8-14 shows the +5V supply. The −2.5V supply output voltage is the input to the +5V supply. The gain of this supply is R52/R50 or about 2.37. The output at the junction of R44 and R52 is about 6V. About 1V is dropped across R55 and R56 so the output to the logger is about 5V. As the output of the −2.5V supply goes toward zero as a result of temperature increase the +5V output also goes toward zero. The combined action of both supplies will maintain the logger gain constant.

◀ TROUBLESHOOTING FLOW DIAGRAM (3 of 3)

SERVICE SHEET 1 (cont'd)

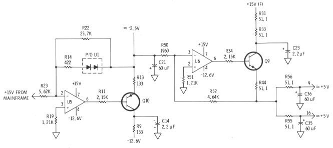


Figure 8-12. Positive and Negative Power Supplies

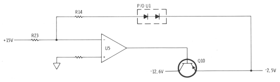


Figure 8-13. −2.5V Supply Simplified Diagram

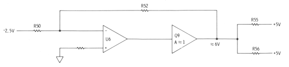


Figure 8-14. +5V Supply Simplified Diagram

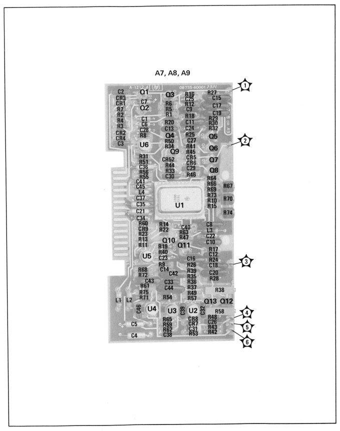
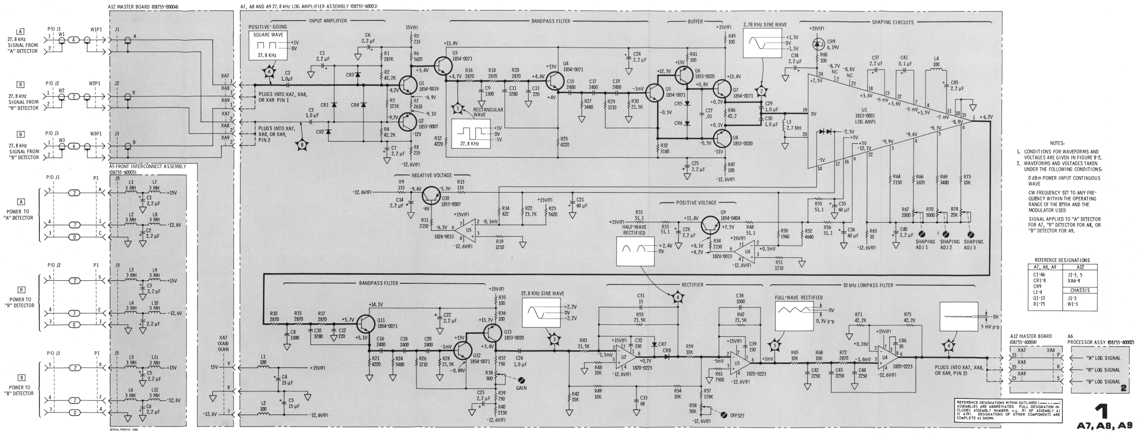

A7, A8, A9
U1
U6
U5
U4
U3
U2
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
Q12
Q13
1
2
3
4
5
6

Figure 8-15. A7, A8 and A9 27.8 kHz Log Amplifier Parts Identification


A12 MASTER BOARD (08755-60004)
A7, A8 AND A9 27.8 kHz LOG AMPLIFIER ASSEMBLY (08755-60003)
INPUT AMPLIFIER
BANDPASS FILTER
BUFFER
SHAPING CIRCUITS
27.8 kHz SIGNAL FROM "A" DETECTOR
27.8 kHz SIGNAL FROM "R" DETECTOR
27.8 kHz SIGNAL FROM "B" DETECTOR
POSITIVE-GOING SQUARE WAVE
27.8 KHz
RECTANGULAR WAVE
27.8 kHz SINE WAVE
PLUGS INTO XA7, XA8, OR XA9 PIN 1
PLUGS INTO XA7, XA8, OR XA9, PIN 2
A5 FRONT INTERCONNECT ASSEMBLY (08755-60005)
POWER TO "A" DETECTOR
POWER TO "R" DETECTOR
POWER TO "B" DETECTOR
NEGATIVE VOLTAGE
POSITIVE VOLTAGE
HALF-WAVE RECTIFIED
LOG AMPL
SHAPING ADJ 1
SHAPING ADJ 2
SHAPING ADJ 3
BANDPASS FILTER
RECTIFIER
30 kHz LOWPASS FILTER
FULL-WAVE RECTIFIED
GAIN
OFFSET
PLUGS INTO XA7, XA8, OR XA9, PIN 15
A12 MASTER BOARD (08755-60004)
A6 PROCESSOR ASSY (08755-60002)
"A" LOG SIGNAL
"R" LOG SIGNAL
"B" LOG SIGNAL
1
A7, A8, A9
2

NOTES:

1. CONDITIONS FOR WAVEFORMS AND VOLTAGES ARE GIVEN IN FIGURE 8-2.
2. WAVEFORMS AND VOLTAGES TAKEN UNDER THE FOLLOWING CONDITIONS:

   0 dBm POWER INPUT CONTINUOUS WAVE

   CW FREQUENCY SET TO ANY FREQUENCY WITHIN THE OPERATING RANGE OF THE 8755A AND THE MODULATOR USED

   SIGNAL APPLIED TO "A" DETECTOR FOR A7, "R" DETECTOR FOR A8, OR "B" DETECTOR FOR A9.

REFERENCE DESIGNATIONS

A7, A8, A9	A12
C1-46 CR1-8 CR9 L1-4 Q1-13 R1-75	J1-3, 5 XA6-9
	CHASSIS
	J1-3 W1-3

REFERENCE DESIGNATIONS WITHIN OUTLINED (——-—) ASSEMBLIES ARE ABBREVIATED. FULL DESIGNATION INCLUDES ASSEMBLY NUMBER; e.g., R1 OF ASSEMBLY A1 IS A1R1. DESIGNATIONS OF OTHER COMPONENTS ARE COMPLETE AS SHOWN.

Figure 8-16. A7, A8, A9 27.8 kHz Log Amplifier Schematic

SERVICE SHEET 2

CIRCUIT DESCRIPTION

±7.5V Power Supplies

The Plus and Minus 7.5V Power Supplies are shown on Schematic 2. The input of the −7.5V supply at U2 pin 2 is the output of the +7.5V supply. Since U2 has a gain of one (R12/R13), the output of the −7.5V supply is the input level with the opposite polarity.

The input of the +7.5V supply at U1 pin 3 is referenced to the −7.5V output through R10, R11, and CR5. The input voltage and the gain of U1 is adjusted using R11 for a +7.5V output.

If the +7.5 volts increases, the −7.5V will go more negative, decreasing the input to U1. With no polarity inversion in U1 and with a gain of about 6, the output of U1 will return to +7.5V which will return the output of U2 to −7.5V.

If U1 opens, both supplies will go to zero. If U2 opens, the −7.5V would go to zero but the +7.5V supply would go to +15V.

SERVICE SHEET 2 (cont'd)

Processor Assembly

The dc output of each 27.8 kHz Amplifier Assembly is fed to the Processor Board. These outputs go through the Master Board to front-panel assembly switches and then back to the Processor Board. The "A" and "B" inputs go through switches and then to summing junctions. The "R" input is applied to two Op. Amps. One is non-inverting and its output is then R. The other is an inverting amp and its output is 1/R. By selecting the appropriate switch, 1/R may be summed with the A input or the B input. Because these signals have logrithmic relationship to the detected RF signal, A+ 1/R (or A − R) for instance, is A/R. The same switches that select "A" and "B" may also select "R" only. Regardless of the switch positions there are only two channels fed to the summing junction.

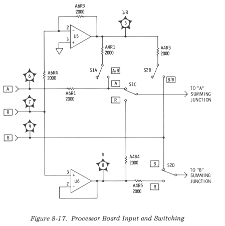

A6R3
2000
1/R
5
2
3
U5
A4R1
2000
A4R3
2000
S1A
A/R
S2B
B/R
6
A6R4
2000
A
A
S1C
A6R1
2000
TO "A"
SUMMING
JUNCTION
7
R
R
9
B
R
8
A4R4
2000
B
S2D
3
2
U6
A4R5
2000
R
TO "B"
SUMMING
JUNCTION

Figure 8-17. Processor Board Input and Switching

SERVICE SHEET 2 (cont'd)

Channel A and Channel B Processor Board output stages are identical. The display sensitivity (dB/Div) is selected by switching in alternate feedback resistors for the Op. Amp. Diodes A6CR1 through A6CR4 limit the maximum input to the Op. Amp. The output signal at A6TP3 and A6TP4 can be filtered or smoothed by switching in filter capacitors with the front-panel SMOOTHING switch. Also, the signal path is grounded when the front-panel POSITION switch is pressed. This prevents any input signal from affecting the positioning of the display trace.

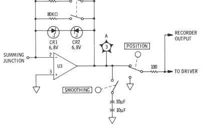

DB/DIV
2KΩ
4KΩ
20KΩ
80KΩ
CR1
6.8V
CR2
6.8V
A
3
SUMMING
JUNCTION
2
3
U3
POSITION
RECORDER
OUTPUT
100
TO DRIVER
SMOOTHING
10µF
10µF

Figure 8-18. Channel A (or B) Processor Board Output

◆ SERVICE SHEET 1
Figure 8-16. A7, A8 and A9 27.8 kHz Log Amplifier Schematic

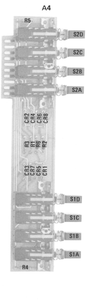
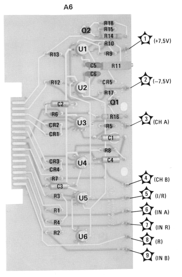
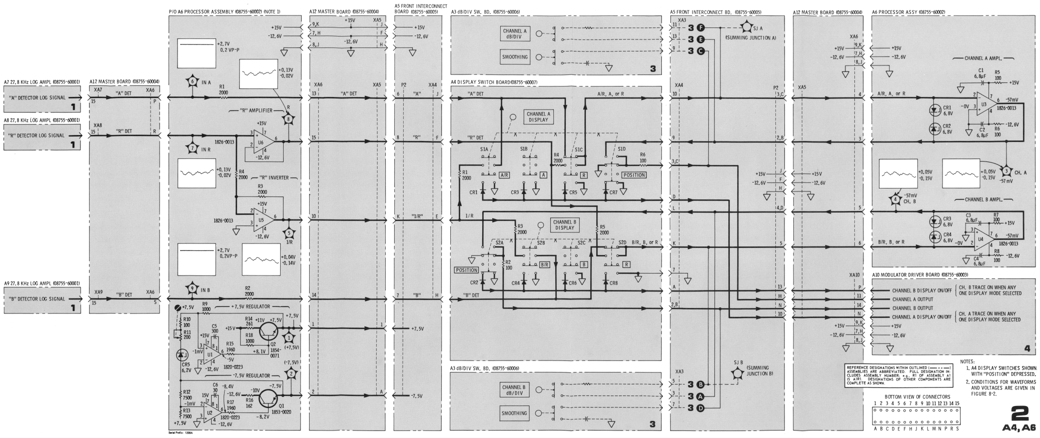

A4
R5
S2D
S2C
S2B
S2A
CR2
CR4
CR6
CR8
R3
R1
R6
R2
CR3
CR7
CR5
CR1
S1D
S1C
S1B
S1A
R4

Figure 8-19. Display Switch, Parts Location



A6
Q2
R18
R15
R14
R10
R9
U1
R13
C5
R11
C6
R12
U2
CR5
R17
C2
Q1
R16
R6
CR2
CR1
U3
R5
C1
R8
C4
CR3
CR4
U4
R7
C3
R3
U5
R1
R4
R2
U6
1 (+7.5V)
2 (−7.5V)
3 (CH A)
4 (CH B)
5 (I/R)
6 (IN A)
7 (IN R)
8 (R)
9 (IN B)

Figure 8-20. A6 Processor Assembly, Parts Location



A7 27.8 KHz LOG AMPL (08755-60001)
"A" DETECTOR LOG SIGNAL
A8 27.8 KHz LOG AMPL (08755-60001)
"R" DETECTOR LOG SIGNAL
A9 27.8 KHz LOG AMPL (08755-60001)
"B" DETECTOR LOG SIGNAL
A12 MASTER BOARD (08755-60004)
P/O A6 PROCESSOR ASSEMBLY (08755-60002) (NOTE 1)
"R" AMPLIFIER
"R" INVERTER
+7.5V REGULATOR
−7.5V REGULATOR
A5 FRONT INTERCONNECT BOARD (08755-60005)
A3 dB/DIV SW. BD. (08755-60006)
CHANNEL A dB/DIV
SMOOTHING
A4 DISPLAY SWITCH BOARD (08755-60007)
CHANNEL A DISPLAY
CHANNEL B DISPLAY
POSITION
A5 FRONT INTERCONNECT BD. (08755-60005)
SJ A (SUMMING JUNCTION A)
SJ B (SUMMING JUNCTION B)
A6 PROCESSOR ASSY (08755-60002)
CHANNEL A AMPL.
CHANNEL B AMPL.
A10 MODULATOR DRIVER BOARD (08755-60003)
CHANNEL B DISPLAY ON/OFF
CH. B TRACE ON WHEN ANY ONE DISPLAY MODE SELECTED
CHANNEL A OUTPUT
CHANNEL B OUTPUT
CHANNEL A DISPLAY ON/OFF
CH. A TRACE ON WHEN ANY ONE DISPLAY MODE SELECTED
A3 dB/DIV SW. BD. (08755-60006)
CHANNEL B dB/DIV
BOTTOM VIEW OF CONNECTORS
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
A B C D E F H J K L M N P R S
2
A4, A6

REFERENCE DESIGNATIONS WITHIN OUTLINED (—-—) ASSEMBLIES ARE ABBREVIATED. FULL DESIGNATION INCLUDES ASSEMBLY NUMBER; e.g., R1 OF ASSEMBLY A1 IS A1R1. DESIGNATIONS OF OTHER COMPONENTS ARE COMPLETE AS SHOWN.

NOTES:

1. A4 DISPLAY SWITCHES SHOWN WITH "POSITION" DEPRESSED.
2. CONDITIONS FOR WAVEFORMS AND VOLTAGES ARE GIVEN IN FIGURE 8-2.

Figure 8-21. A6 Processor and A4 Display Switches Schematic

◆ SERVICE SHEET 2

Figure 8-21. A6 Processor and A4 Display Switches Schematic

SERVICE SHEET 3

CIRCUIT DESCRIPTION

Figure 8-22 shows a simplified schematic of the offset circuit. The offset circuit feeds current to the summing junction that simulate input signals to offset the display. Fixed offsets of up to 59 dB may be obtained by selecting the appropriate front-panel polarity and OFFSET switches. A variable offset of up to 40 dB may be obtained by adjusting the front-panel OFFSET CAL adjust. The input signals plus the offset are applied to the summing junctions.

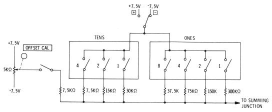

+7.5V
-7.5V
+
−
TENS
ONES
+7.5V
OFFSET CAL
5KΩ
-7.5V
4
2
1
8
4
2
1
7.5KΩ
7.5KΩ
15KΩ
30KΩ
37.5K
75KΩ
150K
300KΩ
TO SUMMING JUNCTION

Figure 8-22. Offset dB Switch

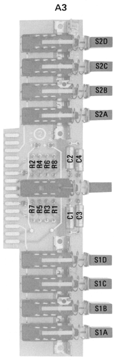
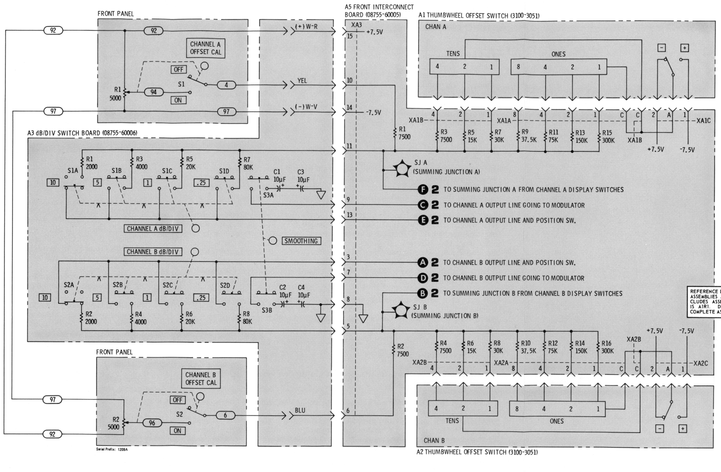

A3
S2D
S2C
S2B
S2A
R2 R4 R6 R8
C2 C4
R1 R3 R5 R7
C1 C3
S1D
S1C
S1B
S1A

Figure 8-23. A3 dB/Division Switch, Parts Location


FRONT PANEL
92
92
CHANNEL A OFFSET CAL
OFF
S1
R1 5000
94
4
ON
97
97
(+) W-R
YEL
(−) W-V
A5 FRONT INTERCONNECT BOARD (08755-60005)
XA3
15
+7.5V
10
14
−7.5V
11
9
13
3
7
8
5
6
A3 dB/DIV SWITCH BOARD (08755-60006)
S1A
R1 2000
S1B
R3 4000
S1C
R5 20K
S1D
R7 80K
C1 10µF
C3 10µF
S3A
10
5
1
.25
CHANNEL A dB/DIV
SMOOTHING
CHANNEL B dB/DIV
S2A
S2B
S2C
S2D
C2 10µF
C4 10µF
S3B
R2 2000
R4 4000
R6 20K
R8 80K
A1 THUMBWHEEL OFFSET SWITCH (3100-3051)
CHAN A
TENS
ONES
4 2 1
8 4 2 1
−
+
XA1B
XA1A
XA1C
C C 2 A 1
R1 7500
R3 7500
R5 15K
R7 30K
R9 37.5K
R11 75K
R13 150K
R15 300K
XA1B
+7.5V
−7.5V
SJ A (SUMMING JUNCTION A)
F 2 TO SUMMING JUNCTION A FROM CHANNEL A DISPLAY SWITCHES
C 2 TO CHANNEL A OUTPUT LINE GOING TO MODULATOR
E 2 TO CHANNEL A OUTPUT LINE AND POSITION SW.
A 2 TO CHANNEL B OUTPUT LINE AND POSITION SW.
D 2 TO CHANNEL B OUTPUT LINE GOING TO MODULATOR
B 2 TO SUMMING JUNCTION B FROM CHANNEL B DISPLAY SWITCHES
SJ B (SUMMING JUNCTION B)
R2 7500
R4 7500
R6 15K
R8 30K
R10 37.5K
R12 75K
R14 150K
R16 300K
XA2B
XA2A
XA2C
+7.5V
−7.5V
CHAN B
A2 THUMBWHEEL OFFSET SWITCH (3100-3051)
FRONT PANEL
CHANNEL B OFFSET CAL
OFF
S2
R2 5000
96
6
ON
97
92
BLU
Serial Prefix: 1208A

REFERENCE DESIGNATIONS WITHIN OUTLINED (—— - - ——) ASSEMBLIES ARE ABBREVIATED. FULL DESIGNATION INCLUDES ASSEMBLY NUMBER; e.g., R1 OF ASSEMBLY A1 IS A1R1. DESIGNATIONS OF OTHER COMPONENTS ARE COMPLETE AS SHOWN.

NOTE:
CONDITIONS FOR WAVEFORMS AND VOLTAGES ARE GIVEN IN FIGURE 8-2.

REFERENCE DESIGNATIONS

A1	A5
A2	R1-16 XA1A,B,C XA2A,B,C
A3	
C1-4 R1-8 S1A-S1D S2A-S2D S3A,B	CHASSIS
	R1,2 S1,2

3

A1, A2, A3, A5

Figure 8-24. A3 dB/Division Switch and A1 and A2 Offset Switches, Schematic

SERVICE SHEET 4

CIRCUIT DESCRIPTION

111.2 kHz Oscillator

Q1 and Q2 form a 111.2 kHz ±4 kHz oscillator (4 X 27.8 kHz). The frequency is determined by C1 and R5. Q13 is a buffer to prevent oscillator pulling. The oscillator output from the buffer is applied to the multiplex driver circuit which selects the display (A only, B only, or chopped) and to the modulator Dual-D Flip Flop which is a divide by 4 circuit to provide the 27.8 kHz modulation signal.

Chopper Blanking

The chopper blanking circuit blanks the display during the transition time in the chopped mode. It also will accept a −5V retrace blanking pulse from an 8690 Series Sweep Oscillator to blank the display during retrace. A modification to the 180 is required to route this input to the 8755A.

When dual or chopped mode is selected, the chopper circuit feeds a signal from the 111.2 kHz oscillator to TP11 through Q19. One output is taken from the emitter of Q19 and at the same time a signal of opposite polarity is taken from the collector. These two signals are differentiated in the copper blanking circuit. A negative trigger is then developed for each transition of the input waveforms. Each negative trigger turns the blanker on which supplies a current pulse to the Model 180 Mainframe to blank the display during the transition time.

Q16 acts as a switch to send a negative pulse from an 8690 Series Sweep Oscillator to the blanker. For sweep oscillators with a positive blanking pulse, retrace blanking is connected directly from the sweep oscillator to the 180 Z-axis input.

Deflection Multiplex Driver

The Multiplex Driver turns the Deflection Multiplexer on and off to select the channel to be displayed.

Each front-panel DISPLAY pushbutton switch has two sections. One section of each switch selects a diode which is connected to ground. With no front panel DISPLAY pushbutton pressed, the Multiplex Driver input is open (High). With any DISPLAY pushbutton pressed, the Multiplex Driver input for the channel selected is grounded (Low). The following table can be used to determine if the Multiplex Driver is operating properly.

SERVICE SHEET 4 (cont'd)

"A"	"B"	U2B			U2A			U2D			TP11	CRT
(XA10-N)	(XA10-P)	5	4	6	1	2	3	13	12	11		
H	H	H	L	H	H	H	L	L	⊓⊔	H	H	Blanked
H	L	L	L	H	H	H	L	L	⊓⊔	H	H	B Trace Only
L	H	H	H	L	L	H	H	H	⊓⊔	L*	L	A Trace Only
L	L	L	H	⊓⊔*	L	H	H	H	⊓⊔	⊓⊔	⊓⊔	Chopped Mode

⊓⊔ = Squarewave

* = Affected by both sections B and D inputs

Deflection Multiplexer

Q18 is a current source for differential ampl. Q17 and Q20. A high (or positive) at TP11 turns Q20 on and Q17 off. When turned on, Q20 is a current source for the B channel differential amplifier Q15A and Q15B. A dc voltage from the position control is applied to the B channel diff-amp at TP10 and the B channel signal is applied at TP9. Each of the two outputs of this diff-amp are fed through a common base voltage amp, Q11 or Q12, and then through the emitter followers, Q4 and Q5 to the CRT deflection plates.

The position control is normally adjusted with no input at TP9. After adjusting the position control, a positive input at TP9 would result in a negative going voltage on the lower deflection plate. At the same time conduction through Q15B would decrease conduction through Q12 which would result in a positive going voltage on the upper deflection plate causing the CRT electron beam to deflect up. Because of the differential action of Q15A and Q15B, moving the position control with signal applied will cause the displayed trace to move; however, even though the base line is not visible, the magnitude between the displayed trace and the base line would remain the same.

When Q20 is turned off and Q17 is turned on, the action of the channel A circuits are the same as the corresponding circuits in channel B.

Divide by 4

The divide by four circuit in the 8755A is a dual "D" type flip-flop. In a "D" type flip-flop, a low at either the set or clear input will prevent the flip-flop from changing states. In this case these inputs are tied to +5 volts so the flip-flop is enabled at all times.

Each "D" type flip-flop will only change state when its input signal or trigger input goes negative. Therefore, each "D" type flip-flop is a divide by two circuit or the dual "D" flip-flop is a divide by four circuit.

◀ SERVICE SHEET 3
*Figure 8-24. A3 dB/Division Switch
and A1 and A2 Offset Switches Schematic*

SERVICE SHEET 4 (cont'd)

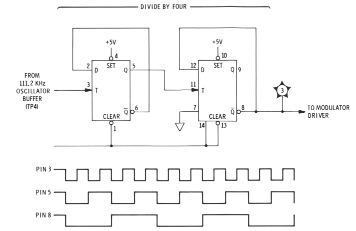


Figure 8-25. Dual "D" Flip-Flop

Modulator Driver

The output of the Dual "D" Flip-Flop is fed to a filter to increase the rise and decay time of the 27.8 kHz square wave. The signal is then applied to Differential Amplifier U3. The input to this IC is about 4V pk-pk and the output is about 12V pk-pk. The output is fed to a Darlington Pair, Q10 and Q8. The Darlington Pair and the output drivers Q6 and Q7 provide current gain to drive the modulator. The driver output is fed to the modulator through a coaxial cable which is floating. The current return path is through the shield of the coaxial cable. All of the current must return through this shield and the shield must not make contact with ground or ground loops may occur and reduce the instrument's dynamic range.

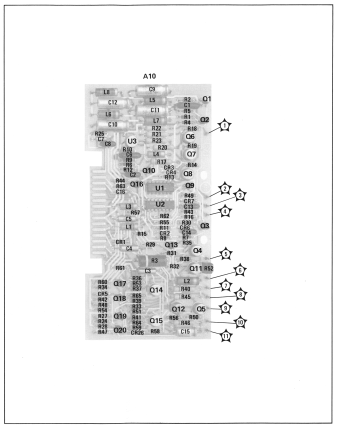
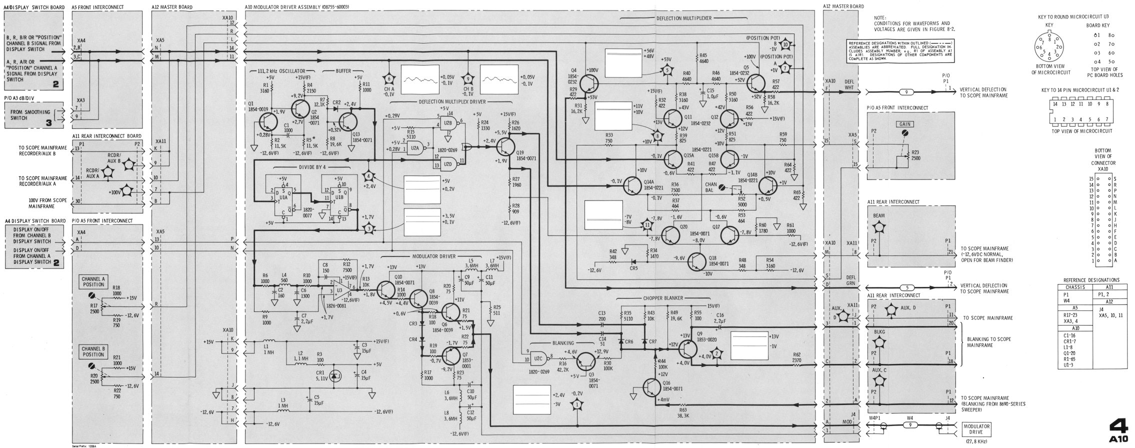

A10
L6
C8
C12
L5
L8
C11
L7
C10
R2
C1
R5
R1
R4
R18
Q1
Q2
Q6
R19
Q7
Q8
Q9
Q3
Q4
Q11
Q14
Q17
Q18
Q19
Q20
Q12
Q5
Q15
Q10
Q13
Q16
U1
U2
U3
R52
CR5
CR7
C15
C14
C13

Figure 8-26. A10 Modulator Driver, Parts Location


A4 DISPLAY SWITCH BOARD
B, R, B/R OR "POSITION" CHANNEL B SIGNAL FROM DISPLAY SWITCH
A, R, A/R OR "POSITION" CHANNEL A SIGNAL FROM DISPLAY SWITCH
2
P/O A3 dB/DIV
FROM SMOOTHING SWITCH
3
A5 FRONT INTERCONNECT
XA4
XA3
A11 REAR INTERCONNECT BOARD
TO SCOPE MAINFRAME RECORDER/AUX B
TO SCOPE MAINFRAME RECORDER/AUX A
100V FROM SCOPE MAINFRAME
RCDR/ AUX B
RCDR/ AUX A
+100V
A4 DISPLAY SWITCH BOARD
DISPLAY ON/OFF FROM CHANNEL B DISPLAY SWITCH
DISPLAY ON/OFF FROM CHANNEL A DISPLAY SWITCH
2
P/O A5 FRONT INTERCONNECT
CHANNEL A POSITION
R17 2500
R18 1000
R19 750
CHANNEL B POSITION
R20 2500
R21 1000
R22 750
A12 MASTER BOARD
XA5
XA10
XA11
Serial Prefix: 1209A
A10 MODULATOR DRIVER ASSEMBLY (08755-60003)
111.2 kHz OSCILLATOR
BUFFER
DIVIDE BY 4
DEFLECTION MULTIPLEX DRIVER
DEFLECTION MULTIPLEXER
MODULATOR DRIVER
CHOPPER BLANKER
BLANKING
(POSITION POT)
CHAN BAL
CH A
CH B
A12 MASTER BOARD
DEFL WHT
DEFL GRN
VERTICAL DEFLECTION TO SCOPE MAINFRAME
P/O A5 FRONT INTERCONNECT
GAIN
R23 2500
A11 REAR INTERCONNECT
BEAM
TO SCOPE MAINFRAME (-12.6VDC NORMAL, OPEN FOR BEAM FINDER)
AUX. D
TO SCOPE MAINFRAME
BLKG
BLANKING TO SCOPE MAINFRAME
AUX. C
TO SCOPE MAINFRAME (BLANKING FROM 8690-SERIES SWEEPER)
W4P1
W4
J4
MOD
MODULATOR DRIVE
(27.8 KHz)
KEY TO ROUND MICROCIRCUIT U3
KEY
BOARD KEY
BOTTOM VIEW OF MICROCIRCUIT
TOP VIEW OF PC BOARD HOLES
KEY TO 14 PIN MICROCIRCUIT U1 & 2
TOP VIEW OF MICROCIRCUIT
BOTTOM VIEW OF CONNECTOR XA10
4
A10

NOTE:
CONDITIONS FOR WAVEFORMS AND VOLTAGES ARE GIVEN IN FIGURE 8-2.

REFERENCE DESIGNATIONS WITHIN OUTLINED (— - - —) ASSEMBLIES ARE ABBREVIATED. FULL DESIGNATION INCLUDES ASSEMBLY NUMBER; e.g., R1 OF ASSEMBLY A1 IS A1R1. DESIGNATIONS OF OTHER COMPONENTS ARE COMPLETE AS SHOWN.

REFERENCE DESIGNATIONS

CHASSIS	A11
P1 W4	P1, 2
A5	A12
R17-23 XA3, 4	J4 XA5, 10, 11
A10	
C1-16 CR1-7 L1-8 Q1-20 R1-65 U1-3	

Figure 8-27. A10 Modulator Driver, Schematic

SERVICE SHEET 4

Figure 8-27. A10 Modulator Driver Schematic

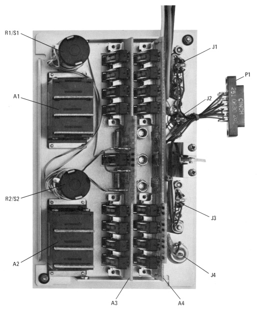

R1/S1
A1
R2/S2
A2
A3
A4
J1
P1
J2
J3
J4
CINCH
251 0630 20

Figure 8-28. Front Panel, Parts Location

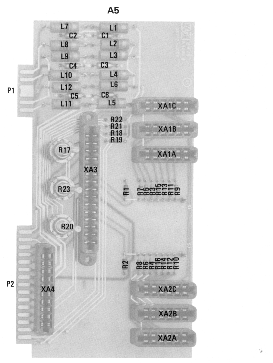
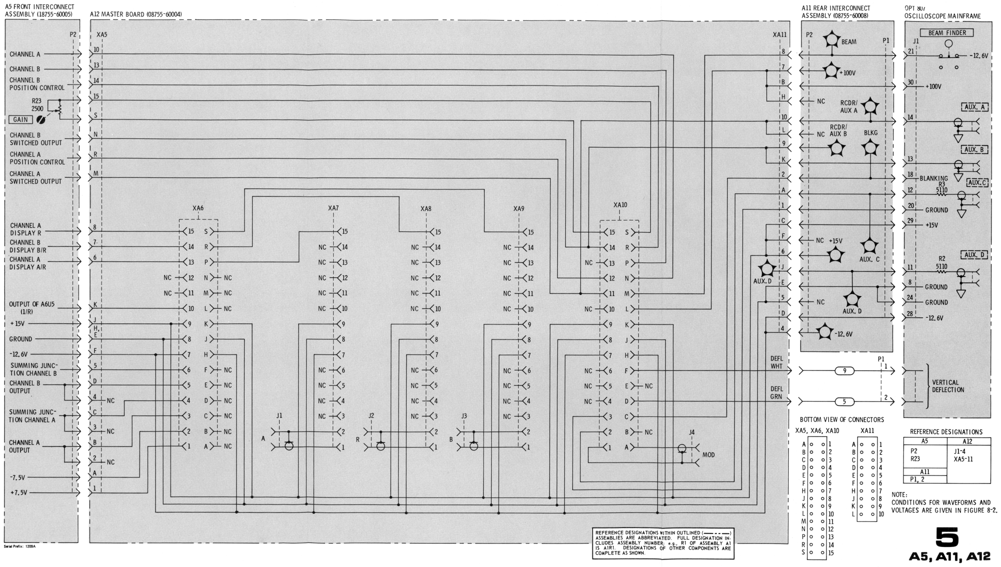

A5
P1
P2
L7
C2
L8
L9
C4
L10
L12
C5
L11
L1
C1
L2
L3
C3
L4
L6
C6
L5
XA1C
XA1B
XA1A
R22
R21
R18
R19
R17
R23
R20
XA3
R1
R7
R2
XA4
XA2C
XA2B
XA2A

Figure 8-29. A5 Front Interconnect, Parts Location


A5 FRONT INTERCONNECT ASSEMBLY (18755-60005)
A12 MASTER BOARD (08755-60004)
A11 REAR INTERCONNECT ASSEMBLY (08755-60008)
OPT 807 OSCILLOSCOPE MAINFRAME
P2
XA5
CHANNEL A
CHANNEL B
CHANNEL B POSITION CONTROL
R23 2500
GAIN
CHANNEL B SWITCHED OUTPUT
CHANNEL A POSITION CONTROL
CHANNEL A SWITCHED OUTPUT
CHANNEL A DISPLAY R
CHANNEL B DISPLAY B/R
CHANNEL A DISPLAY A/R
OUTPUT OF A6U5 (1/R)
+15V
GROUND
-12.6V
SUMMING JUNCTION CHANNEL B
CHANNEL B OUTPUT
SUMMING JUNCTION CHANNEL A
CHANNEL A OUTPUT
-7.5V
+7.5V
NC
XA6
XA7
XA8
XA9
XA10
XA11
J1
J2
J3
J4
A
R
B
MOD
BEAM
+100V
RCDR/ AUX A
RCDR/ AUX B
BLKG
+15V
AUX. C
AUX. D
-12.6V
DEFL WHT
DEFL GRN
P1
BEAM FINDER
J1
AUX. A
AUX. B
AUX. C
AUX. D
BLANKING
R3 5110
R2 5110
GROUND
VERTICAL DEFLECTION
BOTTOM VIEW OF CONNECTORS
XA5, XA6, XA10
XA11

Serial Prefix: 1209A

REFERENCE DESIGNATIONS WITHIN OUTLINED (—— - - ——) ASSEMBLIES ARE ABBREVIATED. FULL DESIGNATION INCLUDES ASSEMBLY NUMBER; e.g., R1 OF ASSEMBLY A1 IS A1R1. DESIGNATIONS OF OTHER COMPONENTS ARE COMPLETE AS SHOWN.

REFERENCE DESIGNATIONS

A5	A12
P2 R23	J1-4 XA5-11
A11	
P1, 2	

NOTE:
CONDITIONS FOR WAVEFORMS AND VOLTAGES ARE GIVEN IN FIGURE 8-2.

5

A5, A11, A12

Figure 8-30. A12 Master Board, A5 Front Interconnect, and A11 Rear Interconnect

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Figure 8-30. A12 Master Board, A5 Front Interconnect and A11 Rear Interconnect Schematic

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HP Part No. 08755-90015

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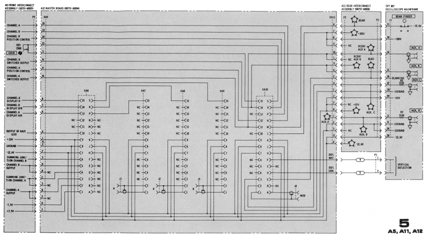
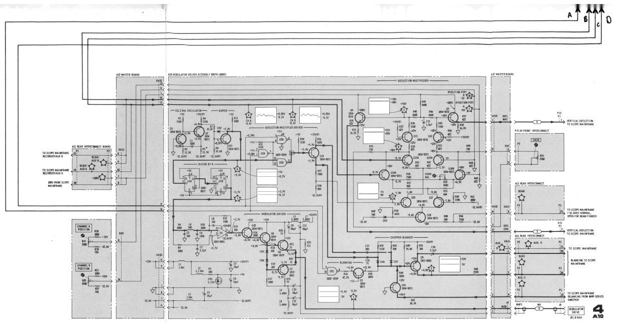


5
A5, A11, A12


A
B
C
D
A11 REAR INTERCONNECT
BEAM
TO SCOPE MAINFRAME (-12.6VDC NORMAL, OPEN FOR BEAM FINDER)
VERTICAL DEFLECTION TO SCOPE MAINFRAME
AUX. D
TO SCOPE MAINFRAME
BLKG
BLANKING TO SCOPE MAINFRAME
AUX. C
TO SCOPE MAINFRAME (BLANKING FROM 8690-SERIES SWEEPER)
MODULATOR DRIVE
(27.8 KHz)
CHANNEL B POSITION

4
A10

HEWLETT-PACKARD MODEL 8755A
SWEPT AMPLITUDE ANALYZER
SERIAL NUMBERS PREFIXED 1209A

OVERALL SCHEMATIC DIAGRAM
HP PART NUMBER 08755-90018

THIS DIAGRAM IS A SUPPLEMENT FOR THE MODEL 8755A OPERATING AND SERVICE MANUAL PRINTED APRIL 1974. HP PART NUMBER 08755-90015.

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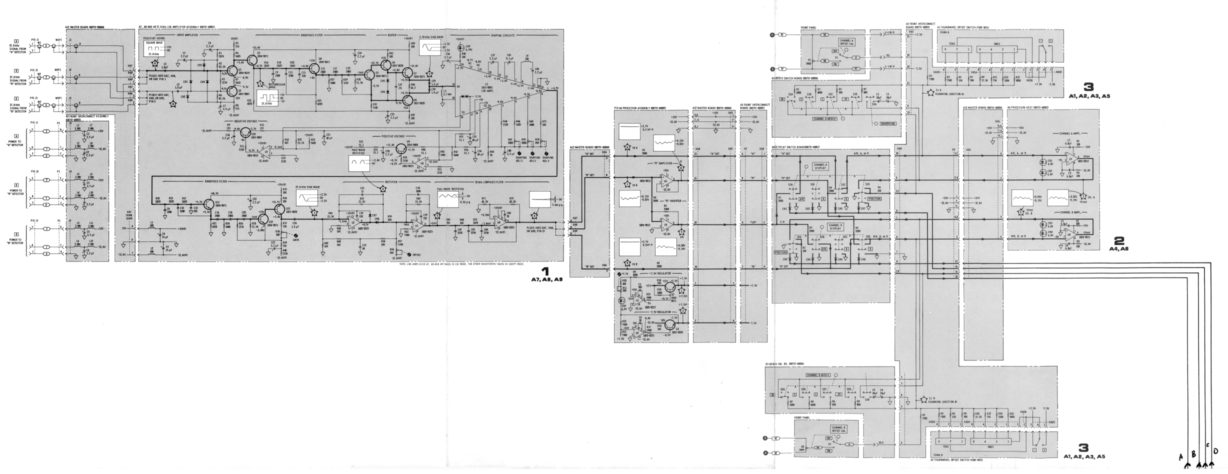
A12 MASTER BOARD (08755-60004)
A7, A8 AND A9 27.8 kHz LOG AMPLIFIER ASSEMBLY (08755-60001)
27.8 kHz SIGNAL FROM "A" DETECTOR
27.8 kHz SIGNAL FROM "R" DETECTOR
27.8 kHz SIGNAL FROM "B" DETECTOR
A5 FRONT INTERCONNECT ASSEMBLY (08755-60005)
POWER TO "A" DETECTOR
POWER TO "R" DETECTOR
POWER TO "B" DETECTOR
INPUT AMPLIFIER
BANDPASS FILTER
BUFFER
SHAPING CIRCUITS
POSITIVE-GOING SQUARE WAVE
27.8 KHz
RECTANGULAR WAVE
2.78 KHz SINE WAVE
U1 1813-0001 LOG AMPL
NEGATIVE VOLTAGE
POSITIVE VOLTAGE
HALF-WAVE RECTIFIED
SHAPING ADJ 1
SHAPING ADJ 2
SHAPING ADJ 3
PLUGS INTO XA7, XA8, OR XA9 PIN 1
PLUGS INTO XA7, XA8, OR XA9, PIN 2
RECTIFIER
10 kHz LOWPASS FILTER
27.8 KHz SINE WAVE
FULL-WAVE RECTIFIED
OFFSET
PLUGS INTO XA7, XA8, OR XA9, PIN 15
1
A7, A8, A9
P/O A6 PROCESSOR ASSEMBLY (08755-60002)
"R" AMPLIFIER
"R" INVERTER
A5 FRONT INTERCONNECT BOARD (08755-60005)
FRONT PANEL
CHANNEL A OFFSET CAL
A3 dB/DIV SWITCH BOARD (08755-60006)
CHANNEL A dB/DIV
SMOOTHING
A1 THUMBWHEEL OFFSET SWITCH (3100-3051)
CHAN A
TENS
ONES
SJ A (SUMMING JUNCTION A)
3
A1, A2, A3, A5
A4 DISPLAY SWITCH BOARD (08755-60007)
CHANNEL A DISPLAY
POSITION
A6 PROCESSOR ASSY (08755-60002)
CHANNEL A AMPL.
CHANNEL B AMPL.
2
A4, A6
A3 dB/DIV SW. BD. (08755-60006)
CHANNEL B dB/DIV
CHANNEL B OFFSET CAL
SJ B (SUMMING JUNCTION B)
CHAN B
A2 THUMBWHEEL OFFSET SWITCH (3100-3051)
3
A1, A2, A3, A5
A
B
C
D

NOTE: LOG AMPLIFIER A7, A8 AND A9 TAKEN IN CW MODE. THE OTHER WAVEFORMS TAKEN IN SWEPT MODE.